American Perfumer AND AROMATICS

COSMETICS
TOILETRIES
SOAPS

•

FLAVORS
AEROSOLS

•

ESSENTIAL OILS

MARCH 1959

THE MAGAZINE OF TASTE AND SCENT

UNGERER

The name with the reputation for uncompromising quality since 1893

basic materials
artfully created for
FINE PERFUMES
and
PERFUME SPECIALTIES

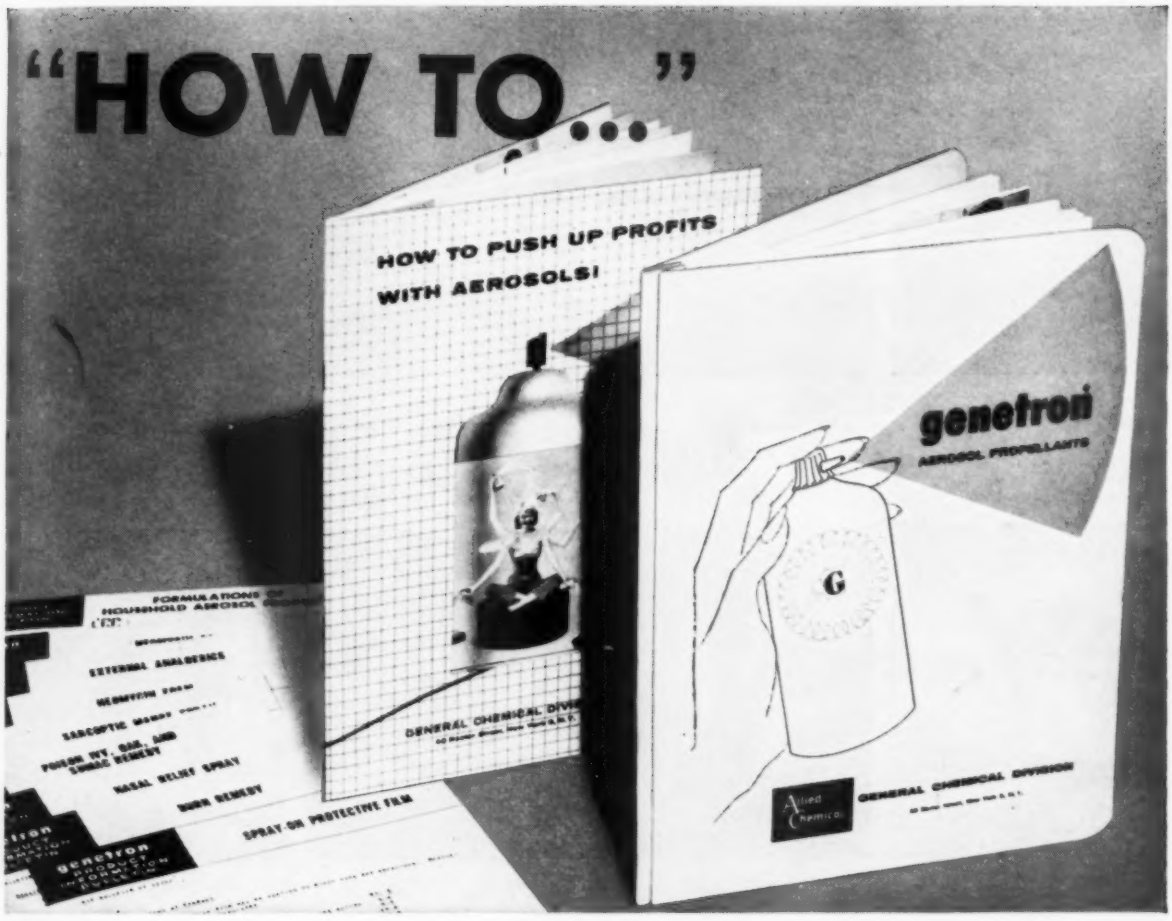
UNGERER & CO. NEW YORK

Ungerer & Co.

161 Avenue of the Americas, New York 13, N. Y.
plant and laboratories
Totowa, N. J.

CHICAGO • BOSTON • PHILADELPHIA • ST. LOUIS • LOS ANGELES • ATLANTA

UNGERER, VIDAL-CHARVET • FRANCE



Free to aerosol marketers...helpful "how to" technical literature from General Chemical

☐ **Product Information Bulletins**

Describe promising new formulations and familiar tested ones for a variety of products studied or developed in our aerosol laboratory. Ask to be put on our mailing list.

☐ **How to Push Up Profits with Aerosols**

Contains valuable market and technical data... projections of potential sales in various markets, prepared by General Chemical's Market Survey Department . . . reliable sources for contract filling . . . basic information about aerosol packages . . . how aerosols work . . . outline of "Genetron" aerosol propellants.

☐ **GENETRON Aerosol Propellants**

A technical manual which includes extensive data on the physical properties of "Genetron" propellants and mixes, General Chemical technical service, commercial filling methods, list of dependable contract fillers, and other topics of interest to the aerosol manufacturer.

genetron®
AEROSOL PROPELLANTS

are putting the push in America's finest aerosols. All standard fluorinated hydrocarbon propellants and mixes are available in the full "Genetron" line—also special propellant mixes where unusual properties are required. Complete technical service is available from our aerosol laboratories.

Mail coupon now for these valuable booklets and bulletins.

Allied Chemical

"Genetron" Department
GENERAL CHEMICAL DIVISION
Allied Chemical Corporation
40 Rector Street, New York 6, N.Y. AP-39

Please send a free copy of

☐ *Product Information Bulletins*, and add my name to your mailing list.
☐ *How to Push up Profits with Aerosols*
☐ *GENETRON Aerosol Propellants*

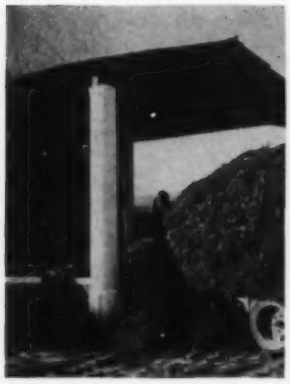
Name_____

Title_____

Company_____

City_____

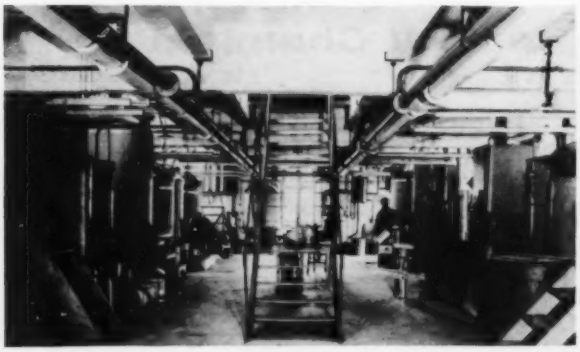
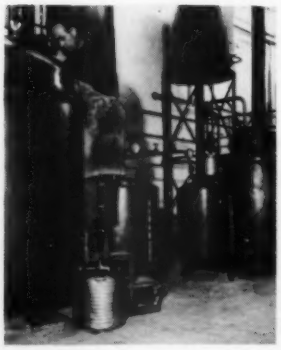
Zone_____ State_____



CAPACITY



QUALITY


for the finest in floral and essential oils

BERTRAND FRÈRES, INC.
443 FOURTH AVE. NEW YORK 16, N.Y.

American Perfumer AND AROMATICS

VOL. 73, NO. 3 MARCH 1959

Contents

COVER: The island of Aegina, Greece, Courtesy of the Greek Press & Information Service.

OFFICES

LOS ANGELES
McDonald - Thompson, Richard Eubanks, 3727 W. Sixth Street, Los Angeles 5, Calif. Dunkirk 7-5391

SAN FRANCISCO
McDonald-Thompson, Morton McDonald, 625 Market Street, San Francisco 5, Calif. Yukon 6-0647

CHICAGO
122 So. Michigan Ave., Chicago 3, Ill.

FORT LAUDERDALE
E. L. Neff, 2808 Middle River Drive, Fort Lauderdale, Florida. LOgan 6-5656

Please address all mail to: AMERICAN PERFUMER AND AROMATICS, 48 West 38th St., New York 18, New York, U.S.A.

JAMES H. MOORE, Jr. *President*
JOHN H. MULLER *Vice President and Business Manager*
M. G. DE NAVARRE *Editorial Director*
WM. E. VANDIVEER *Managing Editor*
WALTER M. BONE *Assistant Editor*
ROBERT E. SANFORD *Circulation Director*
WM. LAMBERT *Senior Editor*
A. van der SHAW *Art Director*
MARY HARRIS *Advertising Production Mgr.*

PUBLISHED MONTHLY by Moore Publishing Company, Inc. Publication office: Emmett St., Bristol, Conn., U.S.A. Editorial and Executive Offices: 48 W. 38th St., New York 18, N.Y. J. H. Moore, Jr., President; Harold W. Springborn, Vice President; G. R. Brennan, Secretary. Subscription Rates: U.S.A., Possessions and Canada, $5 one year; $1.00 per copy. Foreign $15 one year. Entered as second class matter. January 12, 1950, at the Post Office at Bristol, Conn., under act of March 3, 1879. Moore Publishing Co., Inc., is publisher also of Gas Age, Gas Appliance Merchandising, Industrial Gas, LP-Gas and Brown's Directory of American Gas Companies.

(Cable Address: Robinpub, N. Y. Volume 73, No. 3. Copyright 1959, Moore Publishing Co., Inc.)

Choking up...

This is as true in industry as it is in sports.

T.G.A.'s Steve Mayham in a recent talk characterized the cosmetic industry as being substantially depression proof.

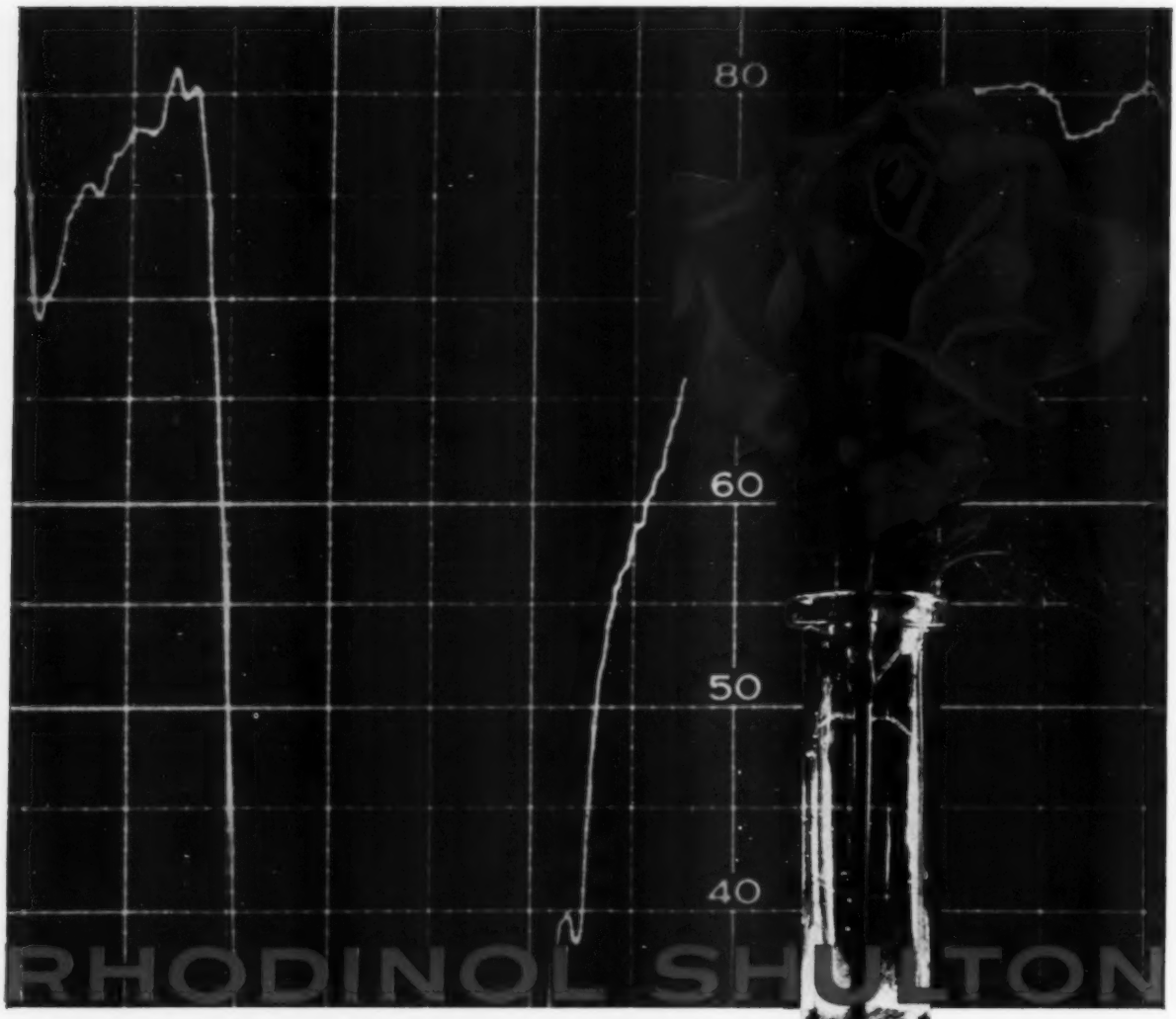
Perhaps other industries would do well to study the method and technique of the cosmetic field. And perhaps we who serve the cosmetic field in some capacity or other should also take heed and follow the pros' approach in overcoming economic or competitive obstacles.

Let us be ever mindful that opportunity is never lacking when you are in the fortunate position of serving the cosmetic industry.

A spokesman for one of America's leading cosmetic firms summed it up neatly when he recently said: "New products are the life blood of the cosmetic industry. We *live* on new products."

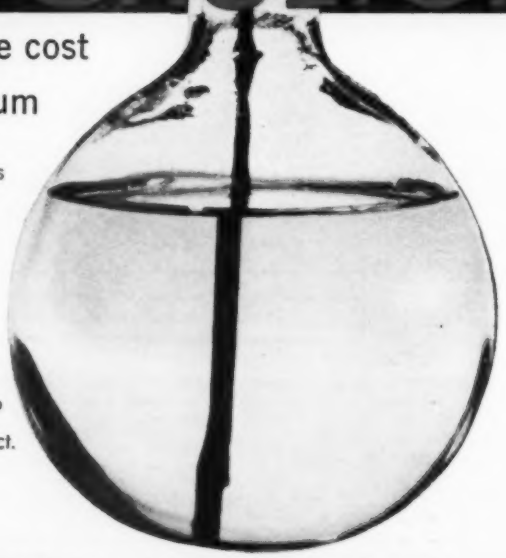
The secret ingredient in the phenomenal growth pattern of the cosmetic industry is its refusal to stand pat . . . thanks to the pros.

James H. Moore, Jr.
Publisher



superb rose effects at half the cost of rhodinol ex-geranium

Rhodinol Shulton is superior to ordinary rhodinols in its freshness effect . . . its blending power . . . its compatibility with the finest perfume materials . . . and its stability in soap. • Shulton's advanced research combined with the perfumer's artistry makes possible this rhodinol of finest quality and constant character. And you can rely on the quality of Rhodinol Shulton because it is free of impurities, free of batch-to-batch variations. • Specify Rhodinol Shulton to procure these superb rose effects at only half the cost you might expect.



SHULTON FINE CHEMICALS

DIVISION OF SHULTON, INC., 630 FIFTH AVE., NEW YORK 20, N. Y., CIRCLE 5-6263

Also available for the perfumer: BENZYL ACETATE • GERANIOL • HELIOTROPINE • ISOEUGENOL • LINALYL ACETATE RHODINOL SHULTON • NITRO MUSKS • VANILLIN, U.S.P. • VANITROPE® ... **Market tested in successful products**

Acknowledgment...

The many fine pats on the back that we have been receiving since the naming of Maison G. deNavarre as Editorial Director of AMERICAN PERFUMER & AROMATICS is indeed heartening and gratifying.

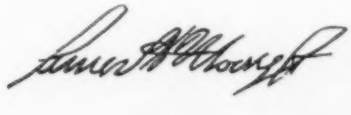
There are mighty few members of the industry, here or abroad, who do not admire him for what he has accomplished. During the past years that Ed has served as Technical Editor, he has contributed a great deal to these pages and to the industry. He is the author of *The Chemistry and Manufacture of Cosmetics, Production Control and Analysis of Cosmetics,* and the *International Encyclopedia of Cosmetic Material Trade Names.* He is a founder and organizer of The Society of Cosmetic Chemists and has furnished much of the spark and the drive that has elevated the society to its lofty status in the industry. He holds the following degrees: Ph.C., B.S., M.Sc., and is a Fellow, American Institute of Chemists, and the New York Academy of Sciences.

The documentaries which are currently appearing in these pages and which are finding such high favor with our readers, also illustrate the ability of Ed de Navarre to plan, organize, and execute editorial projects of no mean dimensions on both a domestic and an international basis.

Just knowing that the overall editorial policies of this publication are now under the guidance of the very capable and proven Maison G. deNavarre, adds a glow to our editorial future.

Announcement...

Of course, there is much work involved in issuing a publication, and the responsibility rests with our experienced New York staff. Because of an accelerated editorial program, now being developed, Senior Editor William Lambert, and Assistant Editor Walter M. Bone are being joined by William E. Vandiveer who has been appointed to the very important post of Managing Editor. Mr. Vandiveer was recently a publicity account executive with O. S. Tyson, Inc., of New York and prior to that was managing editor of ELECTRIC LIGHT & POWER, published by the Haywood Publishing Co., Chicago. He is a native of Arizona, and a graduate of the University of Arizona.



Reheis Chlorhydrol...

basic ingredient for anti-perspirants and deodorants

Used in *creams, lotions, sprays* and *powders*

Available in five forms, granular, fine, medium, impalpable, 50% w/w solution, *Chlorhydrol* (aluminum chlorhydroxide complex) is non-destructive to fabrics . . . non-irritating to skin . . . requires no buffering. Its freshening, astringent properties make it a valuable addition to a wide range of external body products.

Write for complete data.

REHEIS COMPANY, INC.
Berkeley Heights • New Jersey
manufacturers of
Fine Chemicals

1487

WAVEMASK 30

works magic with home permanents

The new Synfleur fragrance WAVEMASK 30 can help cure even your most difficult case in home permanent formulation.

WAVEMASK 30, based on essential oils and aromatic chemicals, carefully tested for stability, compatibility and solubility, is an artistic formulation developed out of long and intensive Synfleur research.

In practical application, it has proven itself as practically a panacea to cold wave preparation odor problems. Additionally, it can be adapted as a basic fragrance for effective use in other thioglycolate products requiring similar masking treatment.

The Synfleur laboratories staff will be glad to assist you on your masking problems with samples, data or other help, without obligation.

Synfleur

SCIENTIFIC LABORATORIES, INC.

MONTICELLO, N. Y.

ATLANTA • DETROIT • LOS ANGELES • NEW YORK • SAN FRANCISCO • MEXICO, D. F. • HAVANA • MONTREAL • Guatemala City • San Salvador • San Pedro Sula

Managua • San Jose • Panama • Barranquilla • Medellin • Bogota • Caracas • Maracaibo • Rio de Janeiro • Buenos Aires • Santiago

New York Sales Office: Telephone Plaza 7-1960

HOLDING THE MIRROR TO MOTHER NATURE!

Specialties FROM HAARMANN & REIMER

NEROFLOR EXTRA For hundreds of years the most important top note in successful perfumery has been Neroli. Its importance today is equally great. Neroflor is a flowery specialty with a pronounced odor of Neroli Oil and Orange Blossom with an interesting animal under-note. Non-irritating, non-discoloring, and excellent fixative. Enhances odor value in compounds. Also an exceptionally fine modifier for colognes.

NEROFLOR SAVON "Savon" possesses the same merits, stable in soaps, and recommended for low priced purposes.

MUGOFLOR A new chemical which is destined to become one of the most important perfume raw materials. True Muguet in character, it is a marvelous blending agent. Completely new chemical of the Muguet type of tenacious, intense, yet fine fresh floral character, neither irritant nor discoloring, absolutely stable in soaps.

AGRUMEN ALDEHYDE A chemical body of unusual merit. Strengthens and refines not only the fresh green note, but also the characteristic note common to all Citrus oils.

VERONA SPECIALTIES

CYCLAMAL From the finest fragrances in so-called handkerchief extracts, soaps and cosmetics to detergents and household products, this universally accepted perfume base has an important place. Economical in use, stable, non-coloring, it imparts the fresh, clean fragrance so greatly desired.

VERONOL A versatile aldehyde of great power. An interesting top note and blending agent, it adds character and quality to any perfume. Use 1/10 to 1%.

FLORANOL An ester to achieve the natural character in Synthetic Rose to which it adds that slight apricot fruitiness found in the fresh flower. Reasonable in price, stable, non-irritating and non-coloring, it is of inestimable value to the perfumer.

SPECIALTIES BY J & E SOZIO, Grasse, France

EGAFLOR ROSE VB A natural base replacement for Attar of Rose with great economy.

ROSE HV Compounded rose base processed by extraction in presence of flowers other than Rose de Mai.

ROSE HM The same base and process, with Rose de Mai.

CHENIRAX Soluble product of extraction of Mousse de Chene and Gum Styrax.

CHENAMBROL Soluble product of extraction of Mousse de Chene and Ciste. Available also decolorized.

DISTIRIS Reconstitution from fractions of natural oils other than Iris Butter, distilled over Iris Roots.

DISTIRONE Reconstitution of Absolute Iris (Irone) odor in a mixture subsequently distilled over Orris Roots.

You are invited to send for samples of any specialties that interest you.

VERONA

VERONA AROMATICS

A DIVISION OF VERONA-PHARMA CHEMICAL CORP.

Plant and Main Office:

26 VERONA AVENUE, NEWARK 4, N. J.

1210 ROSEDALE AVENUE, CHICAGO, ILL.

LAST MINUTE NEWS . . .

Rexall To Display Model Drug Store Behind Iron Curtain

The Rexall Drug Co. has been requested by Walter S. Shafer, Director, Office of International Trade Fairs, Department of Commerce, to set up a model drug store at Poznan, Poland International Trade Fair, June 7 to 21, according to Justin Dart, Rexall president. General theme of the fair, considered one of the most important held in East Europe, is "Industry in the Service of the Consumer." The model Rexall exhibit will include displays of prescription drugs, cologne, jewelry, perfume, gift items, magazines, tobacco, self-service toiletries and non-prescription drugs. Primary objective of the display will be to emphasize to the people of Poland that in the U. S. the customer is king, and that our producers design and manufacture goods to suit him.

Outlays Rise Sharply On Chemical Facilities

Privately financed chemical production facilities costing $1,775,000,000 were completed in the United States last year, according to the Manufacturing Chemists's Association. This is a new high for any year and compares with the previous high of $1,300,000,000 for completed construction established in 1957. The association also said than an additional $1,054,000,000 would be spent for projects now underway and $464,090,000 for projects scheduled for ground-breaking in the near future and completion in 1961. This will bring the total chemical plant construction to an estimated $3,293,000,000 for the three-year period, 1958-60.

Can Makers Turning To Use of Aluminum

American Can Co. announced recently that they are willing to commit increasingly greater research funds on the gamble that the price of aluminum will be reduced enough to make aluminum cans competitive with tin plate cans. The report said that Canco has held a technical interest in aluminum for the past 30 years. It was noted that aluminum prices have been tumbling recently and that the price of aluminum sheet has been reduced to the point where it approaches tin plate on a gauge-for-gauge basis. The manufacturers believe this means that aluminum will find its first use in cans for those products where thermal process is now required and aluminum can replace tin of the same gauge.

Polyethylene Experts Answer Problems At Exposition

Drug industry representatives attending the National Packaging Exposition at Chicago's International Amphitheater, April 13-17 can avail themselves of a unique technical information center on polyethylene at U. S. Industrial Chemical Co.'s exhibit. In a departure from normal industry practice of manning such exhibits primarily with sales personnel, U. S. I. will offer the services of trained specialists who are well versed in polyethylene technology as it applies to drug products. These specialists will be on hand to advise converters and end users on the proper selection of polyethylene necessary for a given application. Questions of specific interest to the drug industry pertaining to the film clarity, flexibility of squeeze containers, printability and color registration can be answered.

Revlon Advertising Head Leaves

George Abrams resigned as advertising vice-president of Revlon Inc. After a short vacation he will assume the presidency of an unnamed package goods company, possibly a Revlon competitor. Mr. Abrams remained on the job for a relatively long period in one of the cosmetic business's toughest jobs. He was with Revlon since August, 1955.

Short Common Names For Food Additives

The procedures of the American Standards Association has been recommended for the development of simple coined names for food additive chemicals. According to the new food additive law to be administered by the Food and Drug Administration, additives contained in food have to be listed on labels. Most of these additives have names of jaw breaking length. Speaking at a recent industry-government meeting, Dr. Bernard L. Oser, president of the Food and Drug Research Laboratories and chairman of the committee appointed to study this problem by the Food Law Institute suggested that short names be developed by common consent through the facilities of the American Standards Association, which is now performing similar work for the pesticide industry.

Economic Commission Urges Help For Spice Sources

The Economic Commission for Asia and the Far East, a unit of the United Nations Economic and Social Council, reports in a survey that the main questions bothering the spice producing countries are how to improve methods of cutivation and reduce production costs, replace uneconomic vines or trees, extend the area under cultivation, control pests and diseases, improve quality, provide better storage facilities, develop local processing and packaging industries, create national development funds and agencies, up producer's co-operatives, and disseminate and exchange information through periodical consultations on tropical products.

Geigy To Host NY Cosmetic Chemists

In what is hoped will start a new annual trend for other manufacturers in the cosmetic field, the New York Chapter of the Society of Cosmetic Chemists have accepted the invitation of the Geigy Chemical Company to hold a meeting at their plant all expenses paid. In addition to providing dinner, a speaker from anywhere in the United States on a topic of interest to be approved by the chapter executive committee and a tour of their plant, Geigy will arrange for limousine transportation from New York City to their plant and return for those who will require it. The chapter has arranged to hold this meeting on May 6.

Social Security Tax Deadline April 15

On or before April 15, next, the sole owner or partner in an unincorporated business is required to file a report of his net self-employment income earned in 1958. Unlike employees, an individual who works for himself is required to report his own tax for Social Security purposes. Coverage under Social Security is not voluntary. If you have an annual net income of $400 or more from your own business or partnership, you are automatically covered.

Four Coal-Tar Colors Removed From Approved List

The FDA has removed four yellow coal-tar colors from the approved list for unrestricted use in foods, and published proposed regulations which may provide replacements for some of the colors now in use. The restriction applies to Yellow Nos. 1, 2, 3, and 4 which may not be used in foods or other products that are consumed internally. Their use will be permitted, however, in drug and cosmetic products which are applied externally. The FDA is proposing to amend the coal-tar color regulations to allow lakes of all permitted food colors to be used in food.

5th Annual Open Symposium of the ASP

The program for the 5th Annual Symposium of the American Society of Perfumers, to be held on April 20th at the Essex House, New York, has been announced and includes the presentation of seven papers on the subject of "Instrumentation and the Perfumer."

U. S. Money Supply Holding Steady

The nation's money supply has been held under remarkably close control despite the 13 billion dollar deficit in the budget in the current fiscal year. Besides the money supply figures at least three other elements, the demand for bank loans by business, almost complete stability in the sensitive commodity price index, and the outlook in agriculture are regarded by government officials as hopeful on the inflation front.

It stands apart...

Essentially for you

D&O
ESTABLISHED 1798

Our 160th Year of Service

flavor bases
dry soluble seasonings
essential oils
aromatic chemicals
perfume bases

because it's the liveliest, the brightest, the most daring. Perhaps its eyes sparkle a bit more mischievously, or its ears are cocked at the most extreme angle. Whatever the reason, from a litter of kittens, one is always singled out for a lion's share of attention from both the mother and affectionate onlookers. In a group of perfume compositions, too, one is always outstanding, but there is an excellent reason. The perfect combination of skill and imagination, experience, knowledge and the finest of raw materials are the ingredients that make a perfume stand apart from all the others. In a group of fragrance products, that one will be D&O!

Technical assistance available on your premises.

DODGE & OLCOTT, INC.

180 Varick Street, New York 14, N. Y.

Sales Offices in Principal Cities

The skin's best friend

DEHYDAG WAX SX

the outstanding self-emulsifying component for oil-in-water emulsions, ideal for the preparation of cosmetic creams and pharmaceutical ointments.

DEHYDAG WAX SX

DEUTSCHE HYDRIERWERKE GMBH
Germany **Düsseldorf**

DISTRIBUTORS IN USA
EAST COAST: Messrs. Fallek Company, Inc., 165, Broadway, New York 6, N. Y./USA. SOUTH: Messrs. Ben Hendrix Trading Co., Inc., 409, Cotton Exchange Building, New Orleans, La./USA. MIDWEST: Messrs. A. H. Cornes, Co., 75, East Wacker Drive, Chicago 1, Ill./USA. WEST COAST: The East Asiatic Co., Inc., 530, West 6th St., Los Angeles 14, Calif. - The East Asiatic Co., Inc., 465 California St., San Francisco 4, Calif. - The East Asiatic Co., Inc., 1005 Equitable Building, 421 S.W. Sixth Ave., Portland 4, Oregon.
DISTRIBUTORS IN CANADA
EAST COAST: Messrs. Canerpa Ltd., Suite 223, Drummond Building, 1117 St. Catherine Street West, Montreal/Canada. CENTRAL: Messrs. Canerpa Ltd., Room 709, 137 Wellington St. West, Toronto/Canada. WEST COAST: The East Asiatic Co., (P. Q.) Ltd., Marine Building, Vancouver 1, B. C.

KNAPP FINE CHEMICALS PRODUCTS INC.
LODI, NEW JERSEY

- **EMULSIFIERS**
- **DETERGENTS**
- **ABSORPTION BASES**
- **FRAGRANCES**

- **SCIENTIFICALLY DEVELOPED AND MANUFACTURED— SPECIFICALLY FOR APPLICATION IN COSMETIC FORMULATIONS**

KNAPP FINE CHEMICALS PRODUCTS INC.
LODI, NEW JERSEY

IN THE THICKET OF INDUSTRY...

the best approach to penetrating any *one* market is by concentrated, pin-pointed sales effort.

To sell the cosmetic industry you need but rely on the *penetrative* power of the American Perfumer and Aromatics.

As the only publication devoted exclusively to the cosmetic industry, the American Perfumer and Aromatics has long been attracting and holding to its editorial pages people of identical interests, occupation and devotion.

If it has an application to improving the production, or the quality or packaging of cosmetics, it best be advertised in the American Perfumer and Aromatics.

AMERICAN PERFUMER
AND AROMATICS

48 West 38th St. • New York 18, N. Y.

OLAK'S RUTAL ORKS INC., MIDDLETOWN, N. Y.

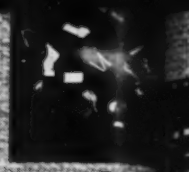
AMERSFOORT, HOLLAND · PARIS, FRANCE · BREMEN, GERMANY · BRUSSELS, BELGIUM · SOFLOR LTD. - PERIVALE, ENGLAND

Quality Control

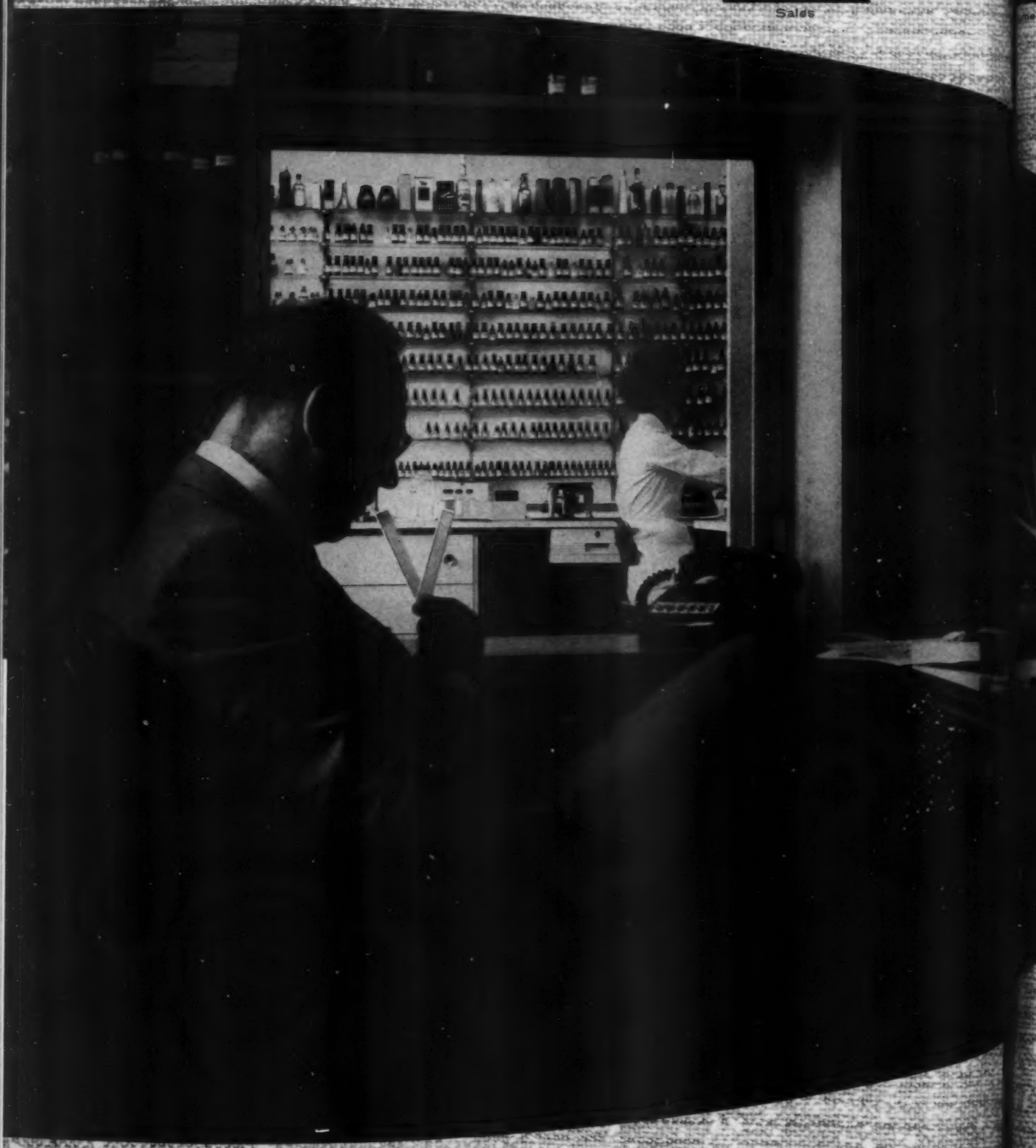
Chemical Manufacturing

Chemical Engineering

Sales



Perf
Evaluatio



e Oil Production

Cosmetic Research

Creative Perfumer

Aromatic Chemical Research

People...

THE IMPORTANT INGREDIENT

To achieve success in the marketing of a new perfume, requires the talents of many people.

Upon the CREATIVE PERFUMER rests the responsibility for the fragrance. His first requirement is that it be truly beautiful, for without intrinsic beauty any success will be short lived . . . . The perfume must be psychologically right to anticipate the preferences, trends, subconscious reactions of those he seeks to please . . . . Of equal importance is the technical rightness of his composition, lasting quality, chemical and physical compatibility . . . . Thus, the perfumer is an artist, a scientist, a psychologist, all tempered with sound and seasoned judgment.

A VAH fragrance goes beyond the ability of one master perfumer . . . . it represents the best creative thinking of a group working as a team with over 400 years of combined experience here and abroad.

van Ameringen-Haebler, Inc.

521 WEST 57th STREET · NEW YORK 19, NEW YORK

van Ameringen-Haebler, S.A.R.L.
Paris, France

van Ameringen-Haebler, Ltd.
Toronto, Canada

CRITICS' CHOICE

Tibetole

Critics acclaim our **New** artificial musk, **TIBETOLE,** the best understudy of the current perfumery season. Its performance matches in every detail that of the finest musk tonquin tincture: in **true** animal-note character; in **potency;** in **effectiveness** in perfumes and colognes; in **stability** and **persistence** in soap and cosmetic preparations.

The one and only way you can distinguish **TIBETOLE** from the original is in price. Needless to say, it is vastly less expensive. And, of course, ready "on cue" at all times. Call or write for an audition (trial sample) of **TIBETOLE.**

FRAGRANCE PLAYS A FEATURE ROLE

Whether fragrance plays a bit part or one that's "up in lights" on your advertising marquee, it plays a feature role in your every product from lipstick to toilet water, from cleansing cream to bath powder. On its performance can depend the success or failure of that product.

As producer, give us the opportunity to serve as your fragrance casting director. Let us in on the act from the beginning. Let our experience dictate a dramatic fragrance choice for you. Or let us custom-create the fragrance compatible with your entire cast of ingredients.

We can help you get the critics' raves; assure you of good box-office; make your product a *tour de force!*

"to get your show on the road" consult:

COMPAGNIE PARENTO, INC.

CROTON-ON-HUDSON, NEW YORK

New York Office: 507 Fifth Avenue — Phone: MUrray Hill 7-5133

COMPAGNIE PARENTO, LTD. • 73 Adelaide Street West, Toronto 1, Ontario, Canada

ESSENTIAL OILS · AROMATIC CHEMICALS · PERFUME BASES · FINE FLAVORS

DESIDERATA

Maison G. deNavarre, M.S., F.A.I.C.

GOOD LUCK

A new journal, TOXICOLOGY AND APPLIED PHARMACOLOGY, edited by F. Coulston and no less than Arnold J. Lehman plus an editorial board selected from the best in six countries, has made its bow with Volume I, No. 1, January 1959, published by Academic Press, Inc., 111 Fifth Avenue, New York 3, New York.

There is a need for applied pharmacology publications. Eleven articles totalling 115 pages make up the first volume. While the first issue didn't have anything particularly pertinent to cosmetics, subsequent issues undoubtedly will.

Good luck!

VEGETABLE EXTRACTS

The use of vegetable juices like those of carrot, cucumber and lettuce have been written off as so much baloney. Yet their use had an origin in early days and persisted because of results obtained. Then came the corner cutters and any resemblance between cucumber lotion properly made, and what was being sold as cucumber, was due to color or odor, neither of which saw a cucumber. As a result, all these creams and lotions based on natural extracts, including the fruits, fell into disrepute.

This doesn't have to be so anymore than aspirin tablets should fall into disrepute because some fly by-night tablets milk sugar and sells it for aspirin.

We often try to flatter our scientific knowledge by writing off as useless, things we do not understand. We have to have scientific tests showing beyond a shadow of a doubt that such is so. Failing to have an adequate test to prove it, we say it isn't so.

Whose face is red that laughed at a witches' brew of foxglove for treating dropsy? or a native medicine man who used rauwolfia as a tranquilizer? or green mouldy bread in the treatment of slow healing sores? or a vegetable brew of certain herbs found useful for women's periodic pain? One could go on. Maybe our own education and intelligence prevents us from seeing the forest because of the trees.

In Europe it has been Royal Jelly, pollen extract, bee embryo, placenta, hormones, fruit and vegetable juices, sea water and many others for a number of years now, that have been found useful in cosmetics. How many have *you* written off as phoney?

This is no brief for useless products but if we listen to some straight-laced purists, they don't think a woman needs anything more than the things with which she was born. (If only she could keep all of them!) But I daresay if one researched far enough, it would be found that Eve used something else besides an apple to work her wiles on Adam.

NOTES

Best wishes for continued success to Leberco Laboratories' Dr. Irving Levenstein and Arthur Cohane. . . . Congratulations to Erik Vles on his 40th year with Polak's Frutal Works. . . . This must have been his first job. . . . The French are reviving a popular 1900 product called "Baume d'Automboile." After World War I it was maggot therapy for slow healing wounds—now Royal Jelly is outdone by the use of termite larva rich in Vitamin T. . . . Some who heard the Schoberl and Bauer paper on the use of Bunte Salt in hair waving at the International Meeting of Cosmetic Chemists in Bonn last September evinced an interest in the paper. I have a reprint of the complete paper and will be glad to Thermo-Fax copies for interested parties (not too many, I hope). . . . FDA isn't buying the use of certain lipstick-type drug dispensers for the "easy way" to cure acne and skin eruptions—FDA medics say the formula is no good for spot application to acne pimples. . . . Coconut oil (and derivatives as a result) prices are far from stabilized. . . . Ran into a statement almost twenty years old that honey contains an estrogen (*C. A. 35*, 6632, 1941). . . . U.S. Patent No. 2,871,161 (January 27, 1959) recently granted covers the use of PVP in an alcoholic solution propelled by a fluorinated hydrocarbon. . . . The aroma of fresh string beans is due to 28 aromatic compounds. . . . You can detect the taste of aliphatic aldehydes C-8-C-12 in water concentrations as low as 10^{-8} to 10^{-9}. . . . It is illegal to use, or to mention vitamin D in a cosmetic in France. . . . The use

Continued on page 23

How Givaudan's experience creates new and finer fragrances

New Givaudan odors created by synthesis are steadily broadening the scope of the perfumer's skills. Examples are the Givaudan musks, unsurpassed for quality and variety.

An industry guide that sets standards for aromatic materials is *The Givaudan Index*, representing years of intensive work by Givaudan analysts, chemists and perfumers.

First impressions at point of sale are important in selling a perfume or cosmetic, and Givaudan's creative skill provides odors with broad and distinctive consumer appeal.

Customers planning new products or lines can benefit from Givaudan's knowledge of consumer preferences, demonstrated in perfumes and cosmetics that enjoy continued success.

Special knowledge of the behavior of all perfume materials in every type of cosmetic enables Givaudan to provide authoritative technical counsel in product planning.

International in scope, Givaudan's modern service is based on world-wide experience and extensive knowledge of ideas and trends in perfumes and cosmetics of every type.

Unique and priceless knowledge gained by years of pioneering in the art of perfumery assures you of the finest in the modern trend.

GIVAUDAN

Better perfume materials through constant research and creative ability

GIVAUDAN-DELAWANNA, INC.

321 West 44th Street • New York 36, N.Y.

TO ATTRACT CUSTOMERS

let Maryland Glass design a bottle or jar for your exclusive use

When you drop a packaging problem in our lap, the end result is more than a glass container. It is an idea . . . born of restless imagination, shaped by skilled hands, backed by years of sound experience. Our creative staff gives you a selling package that packs well, helps stop the eye and start the sale at the point of purchase. For a successful solution to your design problem, contact MARYLAND GLASS CORP., 2153 Wicomico St., Balto. 30, Md.

PACK TO ATTRACT IN

MARYLAND GLASS

BLUE • AMBER • FLINT

of 0.2 per cent PVP in an ordinary barrier or protective cream improves the protection according to British Patent No. 797,992. . . . *The Dragoco Report* No. 2 has an interesting article by Rainer on antioxidants, preservatives and antiseptics in cosmetic products. . . . Ephriam gives a literature review of cases reporting sudden whitening of hair over the last 150 years plus a particular case. He also goes over the theories leading to the phenomenon in A. M. A. ARCHIVES OF DERMATOLOGY for February 1959. . . . I'm just wondering if placenta extracts were not pooh-poohed a little too quickly. A check of the scientific literature is interesting in the data worth looking at again. . . . Make-up seems to be splitting into two well-defined groups, high cover and low cover, while high cover was popular for a long time. . . . A private label house has shown me a thick semi-fluid face mask that goes on wet. When dry it is ripped off almost in one piece. . . . Have you ever thought about the usefulness of an alpha sulfonated stearic acid? . . .

FEDERAL FOOD, DRUG AND COSMETIC ACT 1953-1957. Vincent A. Kleinfeld and Charles Wesley Dunn. Size 6⅝ x 9⅝ in. 1,144 pages. Hard covers, red and gold stamped. Commerce Clearing House, Inc. 1958. Price $25.

This very useful book is the fourth one in the Food Law Institute Series by the same authors. It is a well done first time compilation of the complete administrative and judicial record of the federal food, drug and cosmetic act as amended from January 1953 through December 1957. In it are all pertinent court decisions, statements of general policy and interpretations by the Food & Drug Administration for the years covered. Also included are definitions and standards for foods, sample forms to follow in filing a petition and the full text of all relevant legal changes.

It is possible to locate quickly and easily needed court decisions in the convenient cumulative table of cases which covers this volume and its three predecesor volumes. To executives in the cosmetic and its allied industries as well as attorneys this book will be found to be a practical and comprehensive reference source.

QUESTIONS & ANSWERS

1319: TESTING METHOD

Q. *We have found that different methods are used by the cosmetic industry in order to determine the contents of unsaponifiable matter in fatty alcohol esters. Since different methods give different results, we would appreciate your letting us have the testing method. P. C. F., Mass.*

A. To our knowledge, there is no particular testing method used by the cosmetic industry in this country for the determination of unsaponifiable matter such as is in alkyl sulfate esters. The Society of Cosmetic Chemists has not studied this problem either to date. The American Society of Testing Materials has set up some regulations regarding the methods of testing detergents. We think that these would be the methods most commonly followed by people within the toilet goods industry. These methods are readily available from the Society. The T.G.A. in their method #80 have a test for unsulfated alcohols. Write them if you don't have this.

1320: ROYAL JELLY SCALP CREAM

Q. *Please send a basic formula for a scalp cream with Royal Jelly. C. G. A., Brazil.*

A. It is doubtful whether Royal Jelly will do anything for the skin and that applies to the scalp. Both the Canadian and the U. S. Governments have taken definite stands to the effect that claims made for Royal Jelly in a product cannot exceed those made for a product not containing it. We are not quite certain as to exactly what you want in a scalp cream. Are you after a product that is intended to overcome scalp dryness? Is it supposed to be germicidal? Upon your advice as to what you expect this product to do, we will be pleased to send you a basic formula.

1321: SKIN WHITENER

Q. *We have been doing some work on monobenzyl ether of hydroquinone. So far we have not come up with a satisfactory product. Now I see it has been used in cosmetics. According to an article that appeared recently in one of the chemical publications, it reports serious consequences from use. I am attaching a photostat copy of the article to which I refer. My attention has been called to various cosmetics that are being sold as skin whiteners with the whitening agent being hydroquinone. We have been unable to locate the chemical hydroquinone as such by any other name in spite of our search. The Eastman Kodak Co. does offer such a product, but they abstain from recommending it for use as a drug in cosmetics. Will you please give your appraisal of this product for use in cosmetics for whitening the skin? G. B. W., Calif.*

A. For some time many people have been looking at benzyl hydroquinone as a possible skin bleaching agent. However, its action is unpredictable. The compound seems to be absorbed and can produce some undesirable effects. As a result, to our knowledge, it has been used only by dermatologists and at that in a rather limited way. As for the hydroquinone itself, it is made by the Eastman Chemical Products, Inc., Kingsport, Tenn. Other companies who may be able to supply you with this material are: J. T. Baker Chemical Co., Phillipsburg, N. J.; General Chemical Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.; Verona Chemical Co., 26 Verona Ave., Newark 4, N. J. We cannot give you any information on the whitening effect of hydroquinone on skin as it is an antioxidant, and as such it may inhibit any oxidation reaction. As you know, it had been used as an antioxidant in certain oily skin preparations but this use has fallen by the wayside. At the same time a compound of hydroquinone and ascorbic acid is used as a sunscreen. This use is patented.

From time to time suggestions have been and will be made in this magazine with respect to processes, devices, materials, appliances, equipment and the like. It is not practicable for the writers and editors to have a patent search or examination made in connection with each such suggestion. Our readers are, therefore, requested and indeed urged to determine for themselves whether any patent or other right will be violated before acting on any such suggestion.

Emulsifiers

For ease of use — For dependable results —
For solving difficult problems

Tegacid...

Glyceryl Monostearate — Acid Emulsifying. For anti-perspirant — deodorant creams, lotions and ointments — all greaseless, medicated formulations.

Tegin...

Glyceryl Monostearate — Self Emulsifying. For neutral greaseless creams, lotions, ointments, suntan creams.

Tegin 515...

Glyceryl Monostearate — Non Self-Emulsifying. Used in conjunction with auxiliary emulsifiers.

Tegin P...

Propylene Glycol Monostearate — Self Emulsifying. For greaseless creams—brushless shave, foundation, suntan lotions — foundation, suntan, ointments.

Lanolin Absorption Bases

PROTEGIN X.....ISO-LAN

For Creams, Lotions, and Ointments

• TEGOSEPT PRESERVATIVES • ANTIOXIDANTS

ESTERS OF PARAHYDROXYBENZOIC ACID PROPYL GALLATE ETHYL GALLATE

Goldschmidt
CHEMICAL CORPORATION

153 Waverly Place, New York 14, N. Y.

SALES REPRESENTATIVES

CHICAGO • LOS ANGELES • ST. LOUIS • MONTREAL • TORONTO

THE PHYSICO-CHEMICAL *Behavior* OF *Perfume Materials* IN VARIOUS CARRIERS

DR. J. STEPHAN JELLINEK

Polak's Frutal Works, Amersfoort, Holland

The difficult thing about perfumery is not the multitude of odorants. The layman entering a perfumer's laboratory is always very much impressed by the array of bottles on the shelves and by the man who can distinguish and remember all these different odors. The insider knows that this is relatively easy; a working knowledge of the main perfumery materials may be acquired within a year's time.

What makes perfumery difficult is the unpredictable way in which odorants act when they are combined. Individual odors blend to form new "complex odors" in which the characteristics of each individual component may appear greatly modified. The odor characteristics of each perfume material seem to be variable, they change with the environment, the blend in which the material is used.

There is yet another type of complication which the perfumer daily encounters in his work: this is the fact that even the odor of a given blend of odorants does not appear to be constant. It is influenced to a very large extent by the medium in which the perfume composition is to be used. It is a well-known fact that a given composition, when incorporated in a hair oil, smells quite different than when it is used in a powder or as a simple alcoholic solution. A similar type of odor shift occurs once more when the perfumed product is put to use, i,e., when a cream or lotion is applied to the skin, a hair oil to the hair, etc.

Naturally, it is a very tricky business to create something out of building stones which seem to change as soon as you bring them together and which change again as soon as you put the new creation to use.

Since the dawn of perfumery the perfumer has known only one method to learn how his basic materials smell in different combinations and how the odor of perfume compositions is influenced by the medium in which they are employed and by the surface on which they are finally applied. This method consists in working with the materials day after day, carefuly observing how they smell in different blends and combinations. The perfumer builds his experience slowly, patiently by the entirely empirical method of recording and storing in his mind hundreds, thousands of little individual observations.

One has to understand this method if one wants to understand perfumery. It accounts for the fact that perfumery is an art, the mastery of which lives and dies with the individual perfumer. It accounts for the fact that perfumery can not be taught. The teacher can guide the apprentices work but he can not communicate to him any of the observations which are really important;

these are too subtle for communication, the apprentice has to discover them for himself. Thus, every new generation of perfumers has had to start from the same point from which the preceding generation started.

This is a sweeping statement and actually it isn't quite true. The perfumer of three generations ago had only natural perfumery materials at his disposal—today we work with hundreds of synthetics and new ones are regularly added to the repertoire. Also we can boast today of a much more thorough knowledge of the composition of natural perfume materials than we had even one generation ago. This progress we owe to the tremendous strides which both organic and analytical chemistry have made in the past hundred years and especially in the last few decades. But the thing I am concerned with now, the actual technique of perfumery, this has not changed. The perfumer of today approaches every new problem in very much the same way as did his predecessor of fifty years ago.

This is the way it has always been. Can we be sure, however, that it necessarily has to be this way?

It would be foolish to deny that there are many things in creative perfumery which by their very nature are tied to the individual perfumer and which can never be taught or systematized. Imagination is necessary to conceive of new types of complex odors, taste is required to judge the harmony and subtlety of each new composition and to guide the perfumer to a perfect realization of his ideas. These are the purely artistic elements of perfumery—they are, without any doubt, exceedingly important.

But aside from these there are many things in perfumery which would greatly benefit from a more systematic, more scientific approach. We rarely stop to think of it, but actually we know terribly little about how perfume materials behave when we put them to use. We put a perfume in a cream, a lotion or some other product and we know, from the very fact that we smell the perfume, that some molecules of the odorant must continuously leave the perfumed product and reach our olfactory organ after a trip through the intervening atmosphere. But how the odorant molecules are distributed through the carrier, what forces they have to overcome when they are about to leave the carrier, whether they travel through the atmosphere alone or in groups, these are questions about which we are practically ignorant.

I cannot help feeling that these questions are of fundamental importance in perfumery. They are not only interesting from a theoretical point of view, but they also have far-reaching practical consequences. After all, the ease with which the odorant molecules leave the surface of the carrier largely determines the intensity and tenacity of the odor, the balance of perfume compositions may be upset by the fact that some components are "held back" by the carrier much more tenaciously than others, the age-old problems of fixation and blending depend on forces which odorant molecules exert on one another.

The study of phenomena like adsorption, evaporation and diffusion is part of physical chemistry; these are, therefore, called physico-chemical phenomena. There is another type of chemical changes which touch upon the work of the perfumer: chemical reactions between perfume constituents such as the condensation of aldehydes with amines and with phenols, or between perfume materials and the carrier such as the hydrolysis of esters in alkaline or strongly acid media, transesterification etc. These phenomena lie in the realm of organic chemistry. They are less widespread than the physico-chemical ones and have, moreover, been thoroughly studied. We shall not consider them more closely at this time.

To return to the physico-chemical interactions: whether he is aware of them or not, the outcome of the perfumer's efforts depends very much on these. Since this is so, the perfumer would be much better off if he would set out to study and to understand them rather then trying to cope with them by the purely empirical method of trial and error. It would not be an easy study —all kinds of problems are involved, very little work has been done in this field, so that nearly everything would be pioneering work—but it would be worth while.

Once we understand the most important physico-chemical interactions that influence the odor of a perfumed product we may turn this knowledge to our advantage in the attack of every perfumery problem. It will save us a lot of needless trials and it may even enable us regularly to achieve effects of radiance, fixation or economy which today are found only in exceptionally successful compositions. Furthermore, we shall be able to pass this knowledge on to our successors; thus the new generation will be able to profit greatly from the experiences of the preceding one.

If ever we get to this point, or even close to it, we shall have achieved a major advance in the technique of perfumery.

Within the past decade, the importance of physico-chemical interactions has become increasingly recognized by perfumers. Some time ago, Paul Jellinek stated(1): "The fixing properties of a given compound are not determined by its tenacity (i.e. low volatility) alone, but also by its solvent power for the compounds to be fixed." Instead of "solvent power" I should prefer to say "attractive force," but the two are closely related. More recently, J. Pickthall (2) and Y. R. Naves (3) thoroughly discussed the phenomena of fixing and blending in terms of the physico-chemical interactions between odorant molecules. Pickthall also related the odor effectiveness of perfumery materials in soap to their physical interaction with the soap mass and in a very fine series of experiments succeeded in demonstrating a certain relationship between the odor intensity of a number of materials in soap and their influence on the viscosity of soap solutions (2a). F. V. Wells (4) looked into the physico-chemical interactions between perfumes and the skin and carried out some interesting experiments on the persistence of various aromatics on the living human skin.

Some rules have also been presented recently which relate physico-chemical behavior to olfactory properties. Thus, T. Bassiri (5) remarked that for solutions of any given odorant in different solvents (the concentration being equal in all cases) the odor intensity varies inversely with odor persistence. P. Jellinek (6) stated, discussing the perfuming of creams: "Applying the cream to the skin, the aromatics are the more noticeable the less they are soluble in the vehicle, i.e. are retained by it." These rules, however, have never been systematically investigated. No attempts at quantitative measurements have been made. They remain, therefore, vague and of little scientific value.

What has been done so far in this investigation of physico-chemical phenomena in perfumery is only a small beginning, a breaking of the ground. A lot of work will have to be done until we get to the point where we can formulate scientifically sound rules which may then serve the perfumer as valuable guideposts in his daily work.

Unfortunately, as in all scientific enterprises, we shall make no progress by merely talking about the problems; we shall have to settle down to patient, careful, painstaking experimental work. With this in mind, let me turn to the experimental section of this paper.

Experimental Section

In principle, two types of experiments will have to be carried out. First of all, purely physico-chemical tests: the determination of solubilities, of evaporation and diffusion rates, of surface tensions etc. Secondly, carefully controlled odor tests, designed, for example, to demonstrate the extent to which fixing agents are effective (Pickthall (2), Wells (4) and Pancher (4a) have carried out some interesting experiments of this type), or to show the influence of carriers on the odor characteristics of simple odorants and mixtures. True understanding of the fundamentals will come when we are able to correlate the results of the chemical and the odor tests.

The experiments on which I want to report today fall into the category of controlled odor tests. I want to point out at the outset that I regard the work we have done so far as a very modest, tentative beginning. I present it to you not as any scientific achievement but as an example of the type of experiments that might serve to attack the physico-chemical problems in perfumery.

The problem I picked was: the comparison of the odor intensity of given odorants in different media, in other words: to find out to what extent it is true that "some odorants come out more strongly in oily solution, others in aqueous-alcoholic solution" etc. For one thing, this problem could be attacked by relatively simple experiments. For another it has, apart from its more far-reaching indirect implications, some aspects which are of immediate practical interest to the perfumer.

We compared the odor strength of various odorants in mineral oil and in water. This solvent pair was chosen for several reasons:

1. both solvents may be obtained in practically odorless state, so that the odor of the solvent does not seriously interfere with the determination;

2. because of the extreme difference in polarity between the two solvents any difference in behavior would be expected to show up clearly;

3. tests with this solvent pair might be a useful first step in a systematic study of the perfuming of cosmetic emulsions.

First procedure: Extremely dilute solutions of various odorants in odorless mineral oil and in water were prepared and the "threshold concentration," i.e. the lowest concentration at which the odorant can just be recognized, were determined independently by several persons. The ratio $\frac{\text{threshold concentration in mineral oil}}{\text{threshold concentration in water}}$ would then be the significant quantity. A substance for which the threshold concentration in oil is 10 times as high as in water obviously "comes out" less strongly out of an oily solution than a substance for which both threshold concentrations are equal. The results of preliminary experiments along these lines were not encouraging. No good agreement was obtained between the finding of different individuals and very much seemed to depend on the exact technique of testing. Moreover, small amounts of impurities in the odorants would make the findings invalid. This approach was, therefore, abandoned.

Second procedure: The basic idea behind this procedure was: you take two substances, A and B. Let us say that A comes out more strongly in a mineral oil solution, B more in an aqueous solution. Obviously, when you dissolve a 50:50 mixture of these materials in mineral oil, and also in water, the odor of A will predominate more in the oil solution and that of, B more in the aqueous solution, with the result that the two mixtures will not smell alike. In fact, the oily solution may smell more like an aqueous solution containing A and B in the relation 60:40 or even 70:30. This is the basis of the procedure at hand which can best be illustrated by an actual example, e.g. the comparison of linalool and linalyl acetate.

The following solutions were prepared: (1) a 0.025% solution of linalool in tap water (0.25 g. linalool in 1 l. water), (2) a 0.025% solution of linalyl acetate in tap water, (3) a solution of 0.2 g linalool and 0.2 g linalyl acetate in some odorless mineral oil. The two aqueous stock solutions, (1) and (2), were mixed in various proportions, so that a set of solutions was obtained, thus:

	linalool sol.	linalylacetate sol
A	2 cc	8 cc
B	3 cc	7 cc
C	4 cc	6 cc
D	5 cc	5 cc
E	6 cc	4 cc
F	7 cc	3 cc
G	8 cc	2 cc

200 cc-Glasses containing solutions A-G were put in a row. In another 200 cc-glass a few cc of the mineral oil solution (3) was diluted with mineral oil until the odor strength was approximately the same as that of the aqueous solution. Now four individuals with more or less "trained noses" were asked independently to compare the oily solution with the set of aqueous solutions and to state which of the aqueous solutions was most similar in odor to the oily solution. The smelling was done simply by slightly swirling the glasses and sniffing at the top opening. The verdicts were:

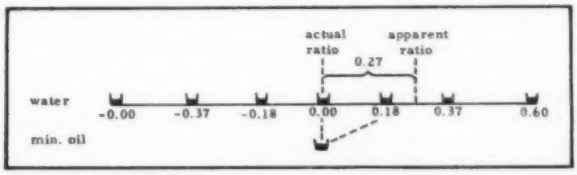
W.R. E most similar to oil solution.
J.H. F most similar to oil solution.

S.J. and W.S. E and F most similar, the mineral oil sol. lies in between. Since actually the ratio linalool: linalyl acetate in the mineral oil solution was the same as that in the solution D it appears that linalool "came out" more strongly in the oily solution. linalyl acetate more in the aqueous solution. This, however, is merely a qualitative statement. It is simple to convert it into a quantative one by calculation the ratio $\frac{\text{concentr. linalool}}{\text{conc. linalyl acetate}}$ for each solution.

	conc. linalool / conc. linalyl acetate	conc. linalool: log conc. linalyl acetate
A	2/8 = 0.25	− 0.60
B	3/7 = 0.42	− 0.37
C	4/6 = 0.67	− 0.18
D	5/5 = 1.00	0.00
E	6/4 = 1.50	+ 0.18
F	7/3 = 2.33	+ 0.37
G	8/2 = 4.00	+ 0.60

We can now characterize each solution by the log of the concentration ratio, (this is better than the concentration ratio itself, because whereas the logs clearly show that, e.g. B and F are equally far removed from the center point, D, the ratios themselves don't) and we can calculate the average of the judgements of the four observers: this is $\frac{0.18 + 0.37 + 0.27 + 0.27}{4} = 0.27$

In the mineral oil solution, conc. linalool/conc. linalyl acetate equals 1.00, the log of this is 0.00. We can illustrate the test and the results obtained by a diagram.



In order to establish a simple and clear-cut mode of expressing the effects with which we are dealing here let us introduce the concept of the "B_{wo} value of a substance." (B_{wo} stands for water-oil-balance). This value will serve to indicate the degree of odor intensification which an odorant undergoes in aqueous solution as compared to an oily solution.

In the experiment described above we worked not with one but with two odorants. What was actually measured was the difference between the degrees of intensification of linalool and linalyl acetate in going from oil to water. In order to set up a scale of B_{wo} value, we shall have to fix, quite arbitrarily, a point of reference. I have chosen linalool as the point of reference and started by assigning the value 1.00 to it (this does not mean that linalool smells exactly equally strong in oily as in aqueous solution!). Since, as the experiment has shown, the degree of intensification in going from oil to water was 0.27 units greater for linalyl acetate than it was for linalool, linalyl acetate would get the value 1.27. The accuracy of the experimental procedure actually does not warrant the use of the second decimal, so we write 1.3, instead. Since it is somewhat awkward always to work with decimals we multiply by 10 and thus obtain the value 13. This we call the B_{wo} value of linalyl acetate. We may now write:

$$B_{wo}(\text{linalylool}) = 10$$
$$B_{wo}(\text{linalyl acetate}) = 13$$

Now that we have established a definition for the B_{wo} value and a procedure for determining it, it is, in principle, simple to find the B_{wo} value of any odorant. We prepare mixtures of the new odorant (let us call it Y) with a substance the B_{wo} value of which is known (let's call this substance X) and determine which ratio in aqueous solution corresponds in odor to a given ratio in oily solution. Then

$$B_{wo}(Y) = B_{wo}(X) + 10\left(\log \frac{\text{conc. X}}{\text{conc. Y}_{water}} - \log \frac{\text{conc. X}}{\text{conc. Y}_{oil}}\right)$$

In this way we have determined B_{wo} values for a number of perfumery materials.

Substance	B_{wo} value
Phenyl ethyl alcohol	4
Coumarine	4
Eugenol	7
Linalool	10
Methyl Anthranylate	10
Hydroxy Citronellal	11
Linalyl Acetate	13
Geraniol	13
Citronellal	16
Amyl Salicylate	19
alpha Ionone	19
Geranyl Acetate	23

When dealing with odorants with very low water-solubility (such as Amyl Salicylate, Geranyl Acetate) we found it simpler to reverse the procedure: we prepared stock solutions of the odorants in mineral oil (usual concentration: 0,5%) and from these we made our series of solutions, A-G. We then matched a dilute aqueous solution of the mixture of the odorants against the oily solution series. This alters nothing in the principle of the method nor in the calculations involved.

Once we had drawn up our table of B_{wo} values we carried out some experiments to check how solidly it stood. We repeated several experiments using different concentrations of odorants (the B_{wo} values should be independent of concentration) and also using the same concentrations, just to see how well we could reproduce our own findings. On the whole, reproducability was good; only when we got to solutions of very low odor intensity (e.g., aqueous solutions of phenyl ethyl alcohol tended to have a very weak odor, marked deviations appeared. In most tests we used linalool as the standard substance against which new odorants were compared. We also checked the system by testing these odorants against substances other than linalool. Our findings are reproduced in table 2. The fit of the data is not perfect, but, I think, good enough to support the contention that the B_{wo} values have (some) significance.

Table 2

Odorant pair	Difference in B_{wo} value Calculated	Observed
Phenyl ethyl alcohol vs. coumarin	0	+1
Phenyl ethyl alcohol vs. hydroxy citronellal	+7	+7
Citronellal vs. Linalyl Acetate	+3	+5
Eugenol vs. Linalyl Acetate	+6	+7
Geraniol vs. Methyl Anthranylate	−3	−2

So here we have a list of B_{wo} values. Let us try and see what they actually mean.

First of all: the B_{wo} values have nothing to do with odor intensity as such, they only refer to the relation between the odor intensity in water and in oil. When a substance has a high B_{wo} value (e.g. amyl salicylate), it means that it will smell stronger in an aqueous solution (e.g., a cold wave lotion, a water-based anti-perspirant) than in hair oil or a sun tan oil. In contrast, a substance with a low B_{wo} value, such as coumarin, would have to be used in a much larger proportion in a perfume for a watery product than in a perfume for oily cosmetics, to get the same odor effect. This is just a rough, qualitative use of the B_{wo} table, but it may be quite useful in practical perfumery. If you want to achieve maximum effects with minimal means you will choose, as much as possible, odorants with a low B_{wo} value if you have to perfume oil-based products and materials with a high B_{wo} value if the problem is the perfuming of an aqueous cosmetic (you may have to compromise here, since the odorants with high B_{wo} values are generally very poorly soluble in water). Odorants probably behave similarly in dilute alcohol as they do in water and similarly in iso-propyl myristate, in petrolatum or in hydrogenated peanut oil as they do in mineral oil. If this is so, the B_{wo} table becomes useful over a much more extensive area. We have not yet done any testing in this direction.

One may also use the B_{wo} values in a quantitative way. In doing this, one has to bear in mind that they are logarithmic values just as, e.g., pH values are logarithmic. It is, therefore, not possible to say that "the odor of a substance with B_{wo} value 16 is intensified twice as much in going from water to oil as that of a substance with B_{wo} value 8." This would be just as incorrect as saying "a solution with pH 8 is twice as alkaline as one with pH 4." To put the B_{wo} values to use we have to go back to the formula.

$$B_{wo}(Y) = B_{wo}(X) + 10\left(\log \frac{\text{conc. X}}{\text{conc. Y}_{water}} - \log \frac{\text{conc. X}}{\text{conc. Y}_{oil}}\right)$$

Assume, we have an oily product, perfumed with a 50:50 mixture of coumarin and linalyl acetate. We now want to get a similar odor-effect in a water-based product. We know: B_{wo} (coumarin) = 4, B_{wo}(linalyl acetate) = 13, and conc. coumarin = 1, so the log is O.O. Substituting in the formula we get.

$$13 = 4 + 10\left(\log \frac{\text{conc. coumarin}}{\text{conc. lin.acet.}_{\text{water}}} - 0.0\right)$$

$$\log \frac{\text{conc. coumarin}}{\text{conc. lin.acet.}_{\text{water}}} = \frac{13 - 4}{10} = 0.9 \qquad \frac{\text{conc. coumarin}}{\text{conc. lin.acet.}} = 8.$$

This means that we have to use a 8:1 mixture of coumarin and linalyl acetate in the aqueous product to get a similar odor effect as we had obtained in the oil-based product with a 1:1 mixture! This example, where the perfume consists of only two constituents, is, of course, quite unrealistic. To test how the B_{w_0} system works in a more complicated case I made a simple composition, containing only materials of known B_{w_0} value, and dissolved this in mineral oil. I then calculated the formula of a perfume which should give a similar odor effect in water. This is what came out:

	Composition for min. oil	Composition for water
Coumarin	2.0	6.1
Eugenol	2.0	4.9
alpha Ionone	2.0	0.3
Methyl Anthranylate	2.0	2.4
Amyl Salicylate	10.0	1.5
Geranyl Acetate	10.0	0.6
Hydroxy Citronellal	10.0	9.8
Phenyl Ethyl Alcohol	10.0	30.5
Geraniol	12.0	7.3
Linalool	20.0	24.4
Linalyl Acetate	20.0	12.2
	100.0	100.0

A mixture was prepared according to the calculated formula and was dissolved in water (0.1 g in 500 cc water, the minimum amount that gave a clear solution.) The oily solution was diluted to equal odor intensity (0.1 g in 500 cc mineral oil). On comparing the two solutions on a blotter their odors were found to be not identical (for mineral oil solutions always have a different odor tone than aqueous solutions) but definitely quite similar. It was very hard to tell, even for a very experienced perfumer, which of the compositions contained more phenyl ethyl alcohol, more ionone or more amyl salicylate!

This work on the B_{w_0} value has to be extended in several directions. We shall have to determine the values for a large number of additional odorants. Some perfume materials can not be tested by the method described above. Thus, the nitro musks are too insoluble both in water and in mineral oil to give solutions of adequate odor intensity. The aliphatic aldehydes deteriorate very quickly in aqueous solutions, either by polymerization or by oxidation or both. But most of the common odorants can certainly be tested in this way. Another very interesting line of research is the study of the behavior of odorants in creams. How strong will a substance with a high B_{w_0} value smell in an oil-in-water emulsion? Like in water or like in oil? What about its odor intensity in water-in-oil emulsions? By carrying out odor tests with various types of emulsions we may gain some insight into the question, how odorants distribute themselves in emulsified product and how this affects their observable odor intensity, both in the jar and on the skin. These things we shall have to know if we are to develop a sound, rational technique of cream perfuming. We have already carried out some experiments along these lines. Our work is still in progress and I hope to be able to report on our results at some future occasion.

The technique for determining relative odor intensities by the study of odorant pairs may, of course, be used in the study of systems other than the mineral oil-water solvent pair. We have used it also to find out to what extent the odor intensity of phenolic odorants is influenced by the presence of non-ionoic surfactants. de Navarre (7) has demonstrated in recent years that phenolic preservatives are partially or totally inactivated in the presence of non-ionic surfactants containing polyoxyethylene groups. It seemed interesting to investigate whether such non-ionics would also weaken the odor of phenolic odorants. This is a quite important question, not only because many cosmetic emulsions contain non-ionic emulsifiers but also because "Tween 20," (Atlas Powder Co.) a substance widely used to solubilize perfume oils in aqueous media, is also a polyoxyethylene compound. Surprisingly, we found that Tween 20 had no significant influence on the odor intensity of the two phenols which we investigated (cf. table 3). Eugenol appears to be somewhat weakened in the presence of Tween 20, but so does linalyl acetate! The odor of a complex phenolic substance seemed to be weakened by Tween 20 to a less extent than that of linalool, our standard also in this test. Our data may be somewhat scanty, but such as they are they do not indicate any pronounced selective weakening of the odor of phenolic substances by Tween 20.

Table 3

Substance	B_{w_1} value
Complex phenol	9
Coumarin	9
Linalool (standard)	10
Linalyl Acetate	12
Eugenol	12

With this I have reached the end of the experimental section of this talk. We are planning to continue research along some of the lines indicated, but we are fully aware that the field is so huge that any one research group will be able to cover only small parts of it. I hope that some of you present today will become sufficiently interested in the physico-chemical behavior of odorants to start exploring it, too.

In our trade, perfumery, there is a strong tradition of anxiously guarding every piece of information that might be valuable. This is perfectly understandable where it concerns manufacturing know-how and formulae. When it comes to a fundamental study of the behavior of odorants, however, maintaining this secrecy would become a great, nearly unsurmountable obstacle. We can achieve progress only if research is carried out in many laboratories, if the results of different investigations can be correlated and if a free exchange of ideas is possible. Moreover, the ultimate aim, the advancing of the technique of perfumery by gaining a deeper understanding of the behavior of odorants, is one by which everyone in the field will profit equally. Surely this aim is very much worth pursuing and pursuing together, in true scientific collaboration!

REFERENCES:

Acknowledgement: I want to express my sincere thanks to the management of Polak's Frutal Works for the support given to this work and especially for the permission to publish this paper without restrictions and without delay.

1. P. Jellinek, "The Practice of Modern Perfumery", Leonard Hill Ltd., London 1954, p. 20.
2. J. Pickthall, Soap, Perf. and Cosm., 30, No. 7 (1957), p. 721; (2a) ibid. 29, No. 7 (1956).
3. Y. R. Naves, Lecture before the "Société Technique des Parfumeurs de France", 1957.
4. F. V. Wells, Soap, Perf. and Cosm., 30, No. 9 (1957), p. 925.
4a. W. A. Poucher, Am. Perf., July 1955, p. 20.
5. T. Bassiri, Am. Perf., Feb. 1958, p. 38.
6. P. Jellinek, Am. Perf., Dec. 1946, p. 52.
7. H. E. Bailey and M. G. de Navarre, Am. Perf., June 1956, p. 34 and subsequent publications.
8. G. J. King, Am. Perf., Oct. 1955, p. 20.

Progress in Perfumery Materials

PART 1

PAUL Z. BEDOUKIAN, PH.D.
Author of Perfumery Synthetics and Isolates

During the past year scientific developments, especially in the military fields, took place at an ever increasing pace. Nevertheless, while satellites, missiles and rockets have created an age in which man is placed under continuous tensions, life must go on and progress is being made in all areas.

Spectacular advances are being made in the realm of chemistry. Attention is being focused on the development of chemical compounds to cure diseases which have plagued mankind since the dawn of time. This has necessitated the discovery of new chemical reactions and processes, and the development of new analytical instruments.

Looking over the literature pertaining to the perfume and related industries, we are impressed by the application of new analytical techniques to the study of essential oils and their components, and by the continued feverish efforts to find new and simpler methods for manufacturing terpene materials from readily available chemical sources.

Already a wide range of terpene materials such as linalool, linalyl acetate, nerolidol, geranyl acetone, geraniol, citronellol as well as menthol, carvone, etc., are available in ample supply and excellent quality from sources other than essential oils.

Essential oils, however, still are an indispensible part of the perfumer's pallette and will of necessity be used in large quantities until a serious effort is made to seek out and determine the nature of trace components found in essential oils which make them so important to the perfume industry. Although some progress is being made in this direction, there seems to be little evidence of a major break-through. This type of work is extremely difficult and will require the cooperative efforts of chemists and perfumers.

In writing this review, much material had to be left out in order to keep it within the scope of this publication. Articles of more immediate and practical interest were given first consideration and some works of academic nature, though contributing significantly to the progress of terpene chemistry, were reluctantly omitted.

OLFACTION and PERFUMES—Much fundamental research will have to be done to further increase our understanding of the nature and perception of odor. Using a large number of aromatic materials, a study was made of the olfactory stimulation of tsetse flies and blowflies, and a mechanism of olfactory stimulation was postulated based on the orientation of the polar molecules in the membranes of the olfactory sensilla of the flies (1). An interesting discussion under the heading of Olfactory Discrimination appeared in a British perfumery journal (2).

Judging perfumes is a difficult task, but judging flavors may possibly present an even greater number of obstacles in spite of the fact that the latter are more closely related to our daily experiences. We can profit from the researches of flavor chemists by applying some of their discoveries to perfumes. In this connection, a publication dealing with definitions and problems in the development of a flavor panel should be of interest to perfumers (3).

While published perfume formulas are seldom if ever meant to be used as such, they do very often suggest to perfumers new approaches to fragrance formulations. Several articles have appeared discussing perfume formulations, including one on compositions of the so-called erogenous perfumes (4), on lilac (5) and hyacinth (6) perfumes. Some interesting suggestions and formulations of perfumes for soaps are given in two other articles (7) (8).

Perfuming hair preparations presents many problems which are not always satisfactorily overcome. An extensive study of the behavior of a large number of perfumery materials used in such preparations was made and the results recorded in a recent publication (9).

ESSENTIAL OILS from FLOWERS—Flower oils play a very important part in achieving artistic perfume compositions and for this reason, any progress in improving the quality or yield of these oils or in investigating their composition, is of value to the industry. The queen of flower oils, rose oil, is being systematically studied in Bulgaria and efforts are being made to increase both the yield and quality. It has long been known that living petals continue producing essential oils. This perhaps explains the increase in the oil yield from the petals by as much as 25-31 per cent when the petals are steeped in water for twelve to twenty-four hours at 30-35° before distillation. Other factors resulting in an increased yield of oil are being investigated (11). The composition of the stearoptene in Bulgarian rose oil was subjected to a study (12). The carbonyl compounds occurring in rose oil were converted to their 2,4-dinitrophenylhydrazones and subjected to a paper chromatographic separation. The presence of the following aldehydes was detected by this procedure: acetaldehyde, propionaldehyde, butyraldehyde, nonyl aldehyde, citral, cinnamic aldehyde and phenylacetaldehyde (13).

The perfumer is always faced with a difficult choice when purchasing lots of rose oil. Olfactory examination based on his previous experience is undoubtedly often the deciding factor but sensitive analytical methods can also be helpful. The use of chromatography followed by infrared spectroscopy has proved to be of considerable value as outlined in a recent authoritative article (14). Experimental distillation of Rosa centifolia grown in Calabria has been found to give encouraging results (15).

A very interesting oil, obtained from Geranium macrorhizum grown in Bulgaria, and known as Zdravetz oil, has very valuable odor characteristics but is unfortunately not readily available commercially. Its chief sesquiterpene constituent is reported to be germacrone, having the structure of monocyclic 10-membered ketone (16). The oil of Pelargonium roseum obtained in Bulgaria is reported to be rich in geranyl and citronellyl formates (17). The possible commercial use of the oil of Lilium candidum has also been investigated (18).

The flower oil from Herzegovinian tobacco flowers has been subjected to a study (19). The oil obtained from Chinese flowers of Michelia fuscata ond Coriandrum sativum was also studied (20). Japanese chemists reported on the occurrence of a ketone chrysanthenone in the oil of chrysanthemum flowers, and the probable structure of this ketone (21).

The technique used in extracting flowers is the determining factor in the odor characteristic of the flower absolute. The advantages of Freon as the solvent for extraction were listed in a recent publication (22). Problems and methods of enfleurage were discussed at some length in another paper (22a). A continuous distillation apparatus for obtaining essential oils from plants is described in a Russian patent (23).

ANALYTICAL PROCEDURES and THEIR APPLICATION to the PERFUME INDUSTRY

Gas chromatography is becoming increasingly popular and is recognized as a very useful tool in the examination of essential oils and aromatics. Many articles have pointed out the usefulness of this procedure in the analysis, identification and purification of perfumery materials. The importance of gas chromatography can be judged by the numerous articles appearing in trade journals (24, 25, 26, 27). Another article suggests suitable carriers and fixed-phase materials for use in gas chromatography (29).

Girard P. reagent has been used to separate the carbonyl compounds of orange oil. The regenerated carbonyls were converted to the 2,4-dinitrophenylhydrazones and these were separated on activated alumina. In this way, carvone, pulegone and decanal were identified (30). Girard T. reagent was used to identify alpha beta unsaturated aldehydes and ketones in essential oils spectrophotometrically (31). Improved techniques for obtaining Girard T. reagent derivatives and then the free carbonyl compounds were reported recently (32).

Chromatographic and spectrophotometric studies of the constituents of lemon oil indicated the presence of eight aldehydes along with other ingredients (33). Techniques have been developed for the study of essential oils obtained from just one or two leaves. This technique has been successfully applied to peppermint and spearmint plants (34).

The carbonyl compounds occurring in essential oils can be separated and determined by converting them to their 2,4-dinitrophenylhydrazones. One method of regenerating carbonyl compounds is to treat them with levulinic acid in the presence of hydrochloric acid (35). Such a gentle treatment makes it highly suitable for the regeneration of terpene carbonyl compounds. Other methods involve the use of stannous chloride as a reducing agent (36). Paper chromatography of the 2,4-dinitrophenylhydrazones obtained from clary sage oil indicated the presence of capraldehyde, carvone, valeraldehyde, butyraldehyde, etc. (37).

It is reported that paper electrophoresis is more rapid than paper chromatography. A detailed discussion of this method of analysis is given in a Japanese

paper (38). It was observed that urea and thiourea form complexes with certain constituents of essential oils, and suggestions have been made for the use of this property as an analytical tool (39). Polarographic studies of a wide range of perfumery materials are reported in another publication (40). Paper chromatography has been used to separate vanillin, ethyl vanillin and isomers (41).

Needless to say, these newer techniques have not rendered the old procedures obsolete. Time tested methods still set the standards in our industry and are constantly being used in the examination of essential oils. It was observed that the distillation method for determining linalool in Brazilian bois de rose oil gave low results because some linalool was lost in the fractions boiling below and above 194-210°C (41a). In another study, linalool content was determined by dehydrating it with a copper catalyst and measuring the water obtained (42). In analyzing for thymol in oil of thyme, instead of using the alkali extraction method, more accurate results are obtained by titrating the phenol in a nonaqueous medium such as benzene using sodium methoxide (43). A colorimetric method (44) and a photometric method (45) were proposed by other authors.

A determination of the perfume content of soaps with an accuracy of 7% was reported in a recent publication. The method was used to extract and examine the perfume present in the soap (46).

One very useful analytical tool has found little application in our industry although it offers many advantages in the examination of essential oils and aromatics. Countercurrent extraction using a column of 25 theoretical stages was reported to separate the stereoisomers 1-menthol from d-isomenthol, and others, cis-trans isomers of o- and m-methyl cyclohexanol and the stereoisomers of 1,2,4,5-tetrabromocyclohexane (47). A theoretical discussion of continuous countercurrent extraction as applied to essential oils is to be found in a British trade journal (48). By extracting lemon oil four times with diacetin, a four-fold lemon oil concentrate can be obtained, according to a German patent (49).

RESEARCH AND DEVELOPMENTS IN SYNTHETIC TERPENES

It is interesting to review the various approaches toward the preparation of synthetic terpene compounds. As yet, none of the procedures reported has given the usual terpenes such as linalool, geraniol, citral, etc. at very low costs, but it is quite likely that before long simpler and more efficient processes will be discovered which will make possible the manufacture of high quality materials at lower prices.

Soviet scientists have been increasingly active in their efforts to obtain synthetic terpenes from readily available isoprene. Thus, it has been possible to prepare citral from isoprene through the above series of reactions.

The yields are very low, in one instance being only 10 grams of citral from 400 grams of isoprene, but the reaction has a number of points of interest (50). Another Soviet publication describes the apparatus for the synthesis of citral from isoprene (51).

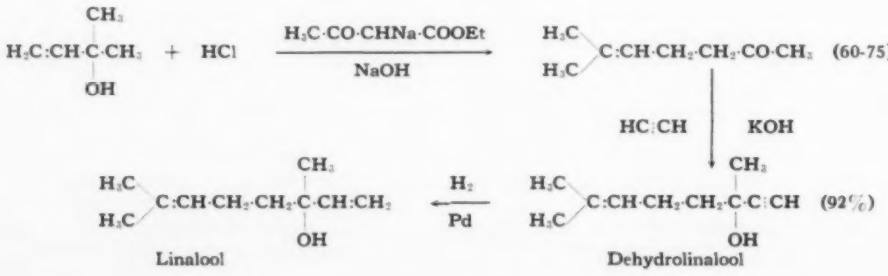
Another approach to the synthesis of terpenes involved treating the readily available methyl butenol with hydrogen halides, followed by treatment with sodium acetoacetic ester in the presence of alkali to give 60-75% methyl heptenone. The latter on treatment with acetylene in the presence of potassium hydroxide gave dehydrolinalool which is easily hydrogenated to linalool (52). Reaction conditions for the synthesis of methyl heptenone from methyl butenol have been subjected to a thorough investigation (53) and also that of acetylene with methyl heptenone (53a).

Addition of alcohols to isoprene oxide (54) (55) was reported to take place in the presence of boron fluoride as the catalyst. It has also been found possible to add alcohols to such compounds as isopropenylacetylere (56). The addition of organic halides to isoprene was reported in a Russian patent (57).

A different approach to the problem of synthesizing terpenes involves the formation of oxides followed by their conversion to oxygenated terpenes. If successful, this method has the advantage of giving halogen-free materials, thus making them eminently suitable for use in perfumes and flavors.

Reduction of limonene monoxide with lithium aluminum hydride gave a mixture of alcohols, including beta terpineol and d-neodihydrocarveol (58). The steric relation of glycols obtained from oxides have been studied (58a). Two approaches to the synthesis of carvone from limonene monoxide were thoroughly investigated (59). The oxide of alpha pinene can be smoothly converted to sobrerol and also other alcohols according to an American patent (60). Another patent describes the preparation of pinonyl alcohol from pinane hydroperoxide (61). Carveol and carvone have been obtained from autoxidation products of limonene (62).

Reduction of diepoxyalloocimene with lithium aluminum hydried gave 2,6-dimethyl-4-octenediols which upon dehydration yielded elgadienols (63). Various



derivatives of these alcohols were studied.

It is also possible to convert epoxides into ketones according to a recent patent. Thus, 2,4-epoxyheptane is converted to 2- and 4-heptanone (64). The rupture of the oxide ring of cineole resulted in the formation of terpineol and terpine hydrate (65).

According to a recent American patent, pyrolysis of 1,8-p-menthadien-3-ol gives citral and isocitral (66). Various useful terpene alcohols were obtained by treating phellandrene hydrochloride under conditions which favor hydration (67).

Two review articles describe the various syntheses of linalool with special emphasis on recent developments (68) (69).

Japanese workers reported the synthesis of tetrahydrolavandulol and tetrahydrolinalool (69a) (69b).

IONONES AND IRONES—Ionone and irone are important to the perfume industry, and beta ionone in the manufacture of synthetic vitamin A. In addition, the chemistry of these substances is so fascinating and presents so many challenging problems to the chemist that it is no wonder so much work is published dealing with their chemistry and manufacture.

A rather unexpected and novel reaction was reported in a recent American patent. It describes the substitution of an olefinic hydrogen with an alkyl group by reacting a terpene with an alkyl sulfate in the presence of a tertiary amine. Thus, geraniol on treatment with methyl sulfate in the presence of piperidine yielded methyl geraniol and citral gave methyl citral, which is the starting material for the synthesis of irone (70). Methyl linalool and related materials have been synthesized starting with methyl acetoacetic ester, through a series of reactions involving several steps (71).

An extensive paper describes the experimental conditions employed for the total synthesis of pseudoionone starting from acetone (72). This is the reaction which is now employed in the commercial production of linalool and ionones. A British patent also describes this reaction (73). In extension of this reaction, a series of pseudoionone homologs and linalool homologs were prepared and their properties studied (74). One of the side products obtained in the pyrolytic rearrangement of dehydrolinalyl acetoacetate is a cyclopentenyl ketone isomeric with ionone, and its structure has been elucidated (72, 75, 75b). This ketone, possessing a valuable earthy-woodsy odor, is now commercially available under the name of pentione, etc. Isomers of pentiones have also been prepared (72). Further light has been shed on the mechanism of this reaction (75a).

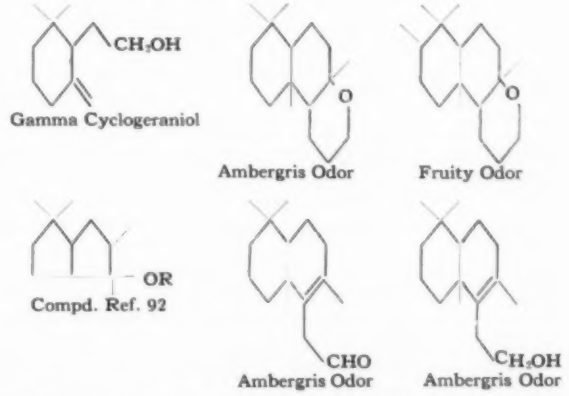
Geranyl acetone, 3-methylgeranyl acetone, pseudoionone and pseudoirone have been synthesized using improved procedures of known reactions (76). An isomer of alpha ionone, with the ring methyl in position 2, has been synthesized and is reported to possess the odor of violets (77). Thiophene derivatives of ionone have also been prepared (78). An improved procedure for the preparation of gamma dihydroionone was reported in a Swiss patent (79). Ketals of dihydroionone, dihydroirone and other ketones are reported to possess desirable odor characteristics according to a British patent (80).

It has been stated that the highest olfactory properties of irone are obtained by correct combination of certain isomers of this valuable ketone. According to a Swiss patent, 2'-methyl-alpha-irone in combination with its stereoisomer in no greater proportion than 4 to 1, gives highly enhanced perfume values by synergic effect (81). According to another patent 6-methyl-alpha-ionone or 6-methyl-beta-ionone and their mixtures have the odor of natural irone (82). The preparation of these irones is disclosed in a German patent (83).

Iso-alpha-irone, iso-alpha-irol and neo-iso-alpha-irols have been prepared and their properties investigated. The spectral differences between the cis and trans forms were pointed out (84). Various derivatives of irone have also been prepared and their properties reported (85).

Pseudoirone has been synthesized starting with 1-bromo-2,3-dimethyl-2-butene and employing the well known series of reactions (86). A new synthesis of irone involved the addition of dimethylchlorobutene to isoprene to yield methyl geranyl chloride which was then converted to methyl citral (87). Treatment of methyl dehydrolinalool with malonic ester gave the ethyl 2,3,6-trimethyl-2,6,8-decatrien-10-oate. The rearranged free acid on treatment with methyl lithium gave pseudoirone (88). Pseudoionone is obtained similarly by starting with dehydrolinalool.

RESEARCH on AMBERGRIS COMPOUNDS—Research is continuing on compounds having ambergris type odors. In continuation of researches in the study of the components of ambergris, one of the more recently discovered compounds to occur in ambergris was gamma cyclohomogeraniol (89). Reduction of ambreinolide with lithium aluminum hydride gave a glycol which on dehydration gave two oxides one of which had a characteristic ambergris odor. The 3-methyl derivative of this oxide was also prepared starting from dihydro-iso-alpha-irone, but was found to have a fruity odor (90).



The acid catalyzed cyclization of ethyl monocyclohomofarnesylate gave three cyclic stereoisomeric lactones, which on reduction gave the glycols, and these on dehydration gave the epoxides which had weak amber odors (91).

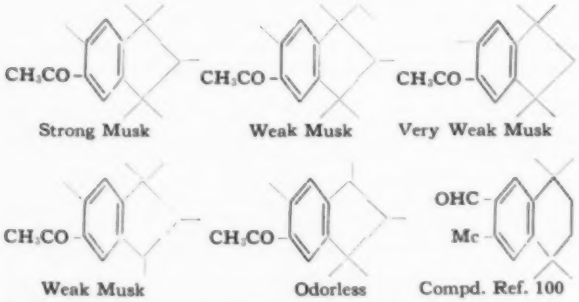
It appears that not only ring ethers (oxides) but also acyclic ethers may possess ambergris odors. Thus, various ethers of 4,8,8-trimethyl-9-methylenebicyclo (3,3,1)-nonan-4-ol have strong, amber-like scents according to a recent patent (92).

Another patent lists products having amber like odors. (93).

A review of recent progress in ambergris research has been published (94). According to a Japanese patent, irradiation of ambergris extract improves and increases the power and aroma of ambergris tincture (95).

PROGRESS IN MUSK COMPOUNDS—In spite of the enormous amount of research in methods of preparing

macrocyclic compounds, the commercial manufacture of macrocyclic musk compounds is still a difficult, tedious task. Two recent Indian patents describe the preparation of civetonedicarboxylic acid (96) and 8-oxopentadecane-1,15-dicarboxylic acid (97). A novel cyclization reaction is reported in which 1,7-octadiyne gave good yields of cyclohexadeca-1,3,9,11-tetrayne (98), on treatment with copper chloride and other catalysts under suitable conditions. The so-called polyalkylindans which possess very powerful and desirable musk odors are becoming popular in perfumery and will most likely find increasing usage in the future. They not only possess fine, strong odors, but are useful in practically all types of formulations, having none of the limitations of nitro musks. According to recent patents, the following alkyl substituted hydrindacenones have musk odors (99).



In addition, a number of substituted tetrahydronaphthalene aldehydes also have musk odors (100) (101). Several aldehydes derived from polyalkylindans have also been shown to have musk odors (102). An interesting review article discusses the use and chemistry of polyalkylindan musk odorants (103).

Two Japanese articles discuss the synthesis of musk ketones (104) and describe a new synthesis of musk ambrette (105).

SYNTHETIC AROMATICS WITH SANDALWOOD ODORS—Periodically, the literature reports the synthesis of substances having sandalwood like odors. It is unfortunate that in most cases the chemist passes judgment on these compounds without benefit of the expert opinion of a competent perfumer. Condensation of camphene with orthocresol gave isobornyl methyl phenol which on hydrogenation gave isobornyl-methylcyclohexanol. The latter has been oxidized to the cyclohexanone analog. Similarly, camphene and guaethol gave a condensation product which on hydrogenation gave a viscous oil having a sandalwood fragrance. The corresponding ketone is reported to have an odor closer to sandalwood. The condensation product of camphene and phenol, on hydrogenation gave an oil having a weak pine odor (106). Fragrant woody odors were obtained by hydrogenating 2-(p-hydroxyphenyl)-2-phenylpropane. The acetate and the corresponding ketone of this dicyclohexyl compound were also prepared (107). A large number of terpenocyclohexanols and the corresponding ketones were prepared by other workers and bornyl-2-methylcyclohexanone was reported as being the most fragrant of the whole series (108). In continuation of these studies, the same workers converted the terpenocyclohexanones to their formylterpenocyclohexanes, terpeno-caprolactones and terpenocaprolactams (109).

A German patent issued in 1953 listed a wide range of such compounds and gave the following interesting odor characteristics: 1-hydroxy-2-methoxy-4-camphanylcyclohexane—sandalwood odor; 1-oxo-2-methoxy-4-camphanylcyclohexane—vetivert odor; 1-hydroxy-2-ethoxy-4-camphanylcyclohexane—fine, intensive sandalwood odor (110).

DEVELOPMENTS IN SYNTHETIC AROMATICS—The research being done on jasmone-type compounds indicates a rising interest in this class of synthetics. Their powerful and pleasant floral character as well as their stability in soap and cosmetic products warrants their general use in many types of perfume formulations. A wide range of methyl alkyl gamma lactones were prepared and converted to the corresponding cyclopentenones by treatment with polyphosphoric acid (111). Alkyl cyclopentenones were also obtained in a similar manner from substituted delta lactones by the same workers (112). A new method of preparing dihydrojasmone was reported in an Indian patent (113). Jasmone homologs can also be prepared directly from unsaturated acids. Thus, undecylenic acid yields 2-hexylcyclopenten-2-one and nonen-2-oic acid; 2-butylcyclopenten-2-one on treatment with polyphosphoric acid (114). Another approach to cyclopentanone derivatives involved the direct alkylation of cyclopentanone. Studies on the methylation of cyclopentanone have been reported (115). An excellent review article discusses at some length the various approaches to the preparation of these compounds, with special emphasis on natural jasmone (116). A similar article appeared in a British journal (116a).

Among the new perfumes aromatics developed, 1-methyl-4-isohexyl-hexahydrobenzaldehyde is reported to possess a flowery odor. Its starting materials are myrcene and methacrolein, both readily available (117). The condensation product of dibutyl ketone and benzaldehyde was stated to possess a pleasant jasmine odor (117a). Valuable odor characteristics are also attributed to diisopropyl benzyl carbinol (118) and 3,6-dimethyl-3-octen-6-ol (119) according to recent patents. Various alkoxy derivatives of unsaturated alcohols having terpene structures possess good odor-imparting characteristics according to an American and a British patent (119, 119a, 119b).

A new method of synthesizing cyclamen aldehyde and its homologs was reported in a recent publication (120). Aliphatic aldehydes are obtained from acids, whether saturated or unsaturated, via their n-methylanilides (121). The current exhaustive review of the preparation of aldehydes has been completed with the publication of the eleventh article in the series (122).

According to a German patent, the unusual and curious compound, cyclooctatetraene, can be converted to phenylacetaldehyde acetals and its phenylethylidene diesters by treatment with appropriate catalysts (123). Conditions for the near quantitative conversion of styrene oxide to phenylethyl alcohols were disclosed in a recent American patent (124). A French patent described the preparation of phenoxyacetaldehyde acetals (125).

Vanillin has been condensed with aliphatic aldehydes in the presence of piperidene (126). Conditions for the oxidation of aryl ethylenes to give anisaldehyde, benzaldehyde, veratric aldehyde and acetophenone are given in a recent British patent (127). An interesting article describes the storage, testing and applications of heliotropin (127a).

In a series of studies, methods have been developed for the determination of cis-anethole by infrared spectroscopy or by gas chromatography in the presence of trans-anethole. Cis anethole is markedly more toxic than the trans isomer (128) (129) (130).

The Essential Oil Association of the U.S.A. has set standards for the following aromatics and essential

oils: allyl caproate, undecylenic aldehyde, benzyl cinnamate, citronellyl acetate, methyl eugenol, diphenyl methane, 1-carvone, d-carvone, phenylacetaldehyde dimethyl acetal, oils of cumin, orris root, tansy, abies alba, eucalyptus citriodora, pinus sylvestris, laurel leaf, basil, estragon, etc.

BIBLIOGRAPHY

(1) J. C. Hughes, Bull. Entomol. Research 48, 561 (1957)
(2) R. W. Moncrieff, Perfumery Essent. Oil Record 49, 27 (1958)
(3) J. F. Caul, S. E. Cairncross and L. B. Sjostrom, Perfumery Essent. Oil Record 49, 130 (1958)
(4) G. Neumann, Kosmetik-Parfum-Drogen Rundschau 4, 36 (1957)
(5) C. Formilee, Soap, Perfumery & Cosmetics 31, 374 (1958)
(6) Ibid, 31, 468 (1958)
(7) R. Huttleston, Soap, Perfumery & Cosmetics, 31, 168 (1958)
(8) A. Hugewonn, ibid, 31, 171 (1958)
(9) E. Sagarin and M. Balsam, Am. Perfumer Aromat 72, No. 2, 43 (1958)
(10) Omit.
(11) N. Nikolov, Ind. Parfum 12, 295 (1957)
(12) B. Stoyanova-Ivanova and D. Ivanov, Compt. rend. acad. bulgare sci. 10, No. 3, 193, (1957)
(13) I. M. Panaiotov and D. Ivanov, Perfumery Essent. Oil Record 49, 231 (1958)
(14) Y. R. Naves, ibid. 49, 290 (1958)
(15) M. Calvarano, Essenze deriv. agrumeri 27, 83 (1957)
(16) I. Ognyanov, D. Ivanov, V. Herout, M. Horak, J. Pliva and F. Sorm, Chem. Listy 52, 1163 (1958)
See also Perfumery Essent. Oil Record, 49, 617 (1958)
(17) E. Dimitrova, V. Staikov and G. Zolotovich, Compt. rend. acad. bulgare sci. 8, 33 (1955)
(18) G. D. L. Zolotovich, Compt. rend. acad. bulgare sci. 10, 61 (1957)
(19) H. Kurt and S. Kapetanovic, Bull. soc. chimistes rep. populaire Bosnie et Herzegovine 6, 17 (1957)
(20) Ping-Yuan Yeh, Perfumery Essent. Oil Record 49, 69 (1958)
(21) M. Kotake and H. Nonaka, Ann. 607, 153 (1957)
(22) H. Tsuda, Koryo No. 42, 10 (1956)
(22a) H. Sozio, Perfumery Essent. Oil Record, 49, 23 (1958)
(23) Y. Ponomarenko, U.S.S.R. Patent 111,667, June 25, 1958
(24) W. A. Wiseman, Perfumery Essent. Oil Record, 48, 380 (1957)
(25) C. L. Teitelbaum, J. Soc. Cosmetic Chemists, 8, 316 (1957)
(26) M. Calvarano, Essenze deriv. agrumari, 27, 208 (1957)
(27) R. L. Blackmore and W. D. Fordham, Parfums, cosmet., savons 1, No. 2, 54 (1958)
(28) G. A. P. Tuey, Soap, Perfumery & Cosmetics, 31, 353 (1958)
(29) Y. R. Naves, J. Soc. Cosmetic Chemists 9, 101 (1958)
(30) A. Weissenberg and D. Ginsburg, Bull. Research Council Israel 5A, 268 (1958)
(31) J. B. Stenlake and W. D. Williams, J. Pharm. and Pharmacol. 9, 900 (1957)
(32) C. L. Teitelbaum, J. Org. Chem. 23, 646 (1958)
(33) M. Calvarano, Essenze deriv. agrumari, 27, 173 (1957)
(34) R. H. Reitsema, F. J. Cramer and W. E. Fass, J. Agr. Food Chem. 5, 779 (1957)
(35) M. Keeney, Anal. Chem. 29, 1489 (1957)
(36) G. Casnati, Atti accad. nazl. Lincei. Rend., Classe sci. fiz., mat. e nat., 22, 54 (1957)
(37) I. Panayotov, Perfumery Essent. Oil Record, 49, 233 (1958)
(38) K. Hayashi and Y. Hashimoto, Pharm. Bull. (Tokyo) 5, 611 (1957)
(39) D. R. Dhingra, Indian Soap J. 22, 97 (1956)
(40) H. Sato, Bunseki Kagaku 6, 81 (1957)
(41) F. Vonasek, Prumysl potravinarsky 9, 315 (1958)
(41a) R. C. de Oliveira, Brazil. Ministerio agr., Inst. oleos, Bol. No. 13 175 (1955)
(42) H. Steindelowna, Biul. Inst. Roslin Leczniczych, 3, 139 (1957)
(43) M. I. Blake, Anal. Chem. 30, 400 (1958)
(44) L. Fibranz, M. I. Blake and C. E. Miller, J. Am. Pharm. Assoc. 47, 133 (1958)
(45) J. Meinhard, Pharmazie, 12, 413 (1957)
(46) A. Ady and L. Hunyady, Fette, Seifen, Anstrichmittel 60, 378 (1958)
(47) G. Kortum and A. Bittel, Chem-Ing.-Tech. 30, 95 (1958)
(48) J. M. Blatterman, Perfumery Essent. Oil Record, 48, 514 (1957)
(49) K. H. Bischofswerder et al, Ger. Patent, 884,676, July 30, 1953
(50) K. V. Leets, et al., Zhur. Obshchei Khim. 27, 1510 (1957)
(51) K. V. Leets et al., Maslaboino-Zhirovaya Prom. 23, No. 8, 33 (1957)
(52) I. N. Nazarov et al., Izvest. Akad. Nauk S.S.S.R., Otdel Khim. Nauk (1957) 1267
(53) I. N. Nazarov et al., Doklady akad. Nauk S.S.S.R. 114, 331 (1957
(53a) Ibid., 114, 796 (1957)
(54) A. N. Pudovik and B. E. Ivanov, Uchenye Zapiski Kazan. Gosudarst. Univ. im. V. I. Ulyanova-Lenina 116, No. 1, Obshcheuniv. Sbornik 141 (1956)
(55) A. N. Pudovik and S. G. Denislamova, Zhur. Obshchei Khim 27, 2363 (1957)
(56) I. A. Favorskaya and N. N. Kopylov-Shakmatov, ibid., 27, 2406 (1957)
(57) K. V. Leets, U.S.S.R. Patent 105,428, May 25, 1957
(58) G. V. Pigulevsky et al., Zhur. Obschei Khim. 28, 1413 (1958)
(58a) H. Schmidt, Suomen Kemistilehti B31, 61 (1958)
(59) S. M. Linder and F. P. Greenspan, J. Org. Chem. 22, 949 (1957)
(60) E. A. Klein, U.S. Patent 2,815,378, Dec. 3, (1958)
(61) V. P. Wystrach and R. K. Madison, U.S. Patent 2,824,138, Feb. 18, 1958
(62) G. Widmark, Arkiv kemi 11, 211 (1957)
(63) Y. R. Naves and B. Wolf, Bull. soc. chim. France (1957) 1039
(64) E. Arundale and J. H. Jones, U.S. Patent 2,799,708, July 16, 1957
(65) I. Ogura, Yakugaku Zasshi, 78, 932 (1958)
(66) A. B. Booth and E. A. Klein, U.S. Patent 2,815,383, Dec. 3, 1957
(67) J. P. Bain, A. B. Booth and E. A. Klein, U.S. Patent 2,827,499, Mar. 18, 1958
(68) E. Tomikashi, Koryo, No. 45, 12 (1957)
(69) P. E. Chaleyer, Perfumery Essent. Oil Record, 49, 17 (1958)
(69a) R. Kitaoka, Nippon Kagaku Zasshi, 77, 627 (1956)
(69b) S. Kanao and Takeshi Toyoda, Japan Patent 8614 ('57) Oct. 7
(70) A. Verley, U.S. Patent 2,837,569, June 3, 1958
(71) I. K. Sarycheva et al., Zhur. Obshchei Khim. 27, 2994 (1957)
(72) W. Kimel, N. W. Sax, S. Kaiser, G. G. Eichmann, G. O. Chase and A. Ofner, J. Org. Chem. 23, 153 (1958)
(73) F. Hoffmann-LaRoche & Co., A-G. British Patent 788,301, Dec. 23, 1957
(74) W. Kimel, J. D. Surmatis, J. Weber, G. O. Chase, N. W. Sax and A. Ofner, J. Org. Chem. 22, 1611 (1957)
(75) Y. R. Naves, P. Ardizio and B. Wolf, Bull. soc. chim. France (1957) 1213
(75a) G. Saucy, L. H. Chopard-dit-Jean, W. Guex, G. Ryser and O. Isler, Helv. Chim. Acta, 41, 160 (1958)
(75b) W. Kimel and N. W. Sax, U.S. Patent 2,799,706, July 16, 1957
(76) I. N. Nazarov et al., Doklady Akad. Nauk S.S.S.R. 114, 1029 (1957)
(77) C. Daessle and H. Schinz, Helv. Chim. Acta 40, 2270 (1957)
(78) Michel, Sy. Inds. parfum. et cosmet. 12, 351 (1957)
(79) M. Stoll, U.S. Patent 2,813,894, Nov. 19, 1957
(80) A. Firmenich, R. Firmenich, G. Firmenich and R. E. Firmenich, Brit. Patent. 768,685, Feb. 20, 1957
(81) Y. R. Naves, Swiss Patent 322,632, Aug. 15, 1957
(82) H. Schinz, U.S. Patent 2,801,266, July 30, 1957
(83) H. Schinz, Ger. Patent 933,149, Sept. 22, 1955
(84) Y. R. Naves, Helv. Chim. Acta 40, 1123 (1957)
(85) Y. R. Naves, Bull. soc. chim. France (1957) 1220
(86) I. K. Sarycheva, G. A. Verobeva and N. A. Preobrazhenskii, Zhur. Obshchei Khim. 27, 2662 (1957)
(87) K. V. Leets et al., ibid., 27, 1384 (1957)
(88) I. K. Sarycheva et al., ibid., 27, 2653 (1957)
(89) C. F. Seidel and M. Stoll, Helv. Chim. Acta 40, 1990 (1957)
(90) R. E. Wolff, Compt. rend. 239, 711 (1954)
(91) G. Lucius, Arch. Pharm. 291, 57 (1958)
(92) Max Stoll, U. S. Patent 2,803,662, Aug. 20, 1957
(93) Max Stoll, U. S. Patent 2,809,996, Oct. 15, 1957
(94) Max Stoll, J. Soc. Cosmetic Chemists 9, 167 (1958)
(95) T. Nakatani, Jap. Patent 9500 ('56), Nov. 6.
(96) U. G. Nayak, K. K. Chakravarti and S. C. Bhattacharyya Indian Patent 56, 391, Feb. 26, 1958.
(97) Ibid, Indian Patent 55,757, Feb. 5, 1958
(98) F. Sondheimer and Y. Amiel, J. Am. Chem. Soc. 79, 5817 (1957)
(99) M. S. Carpenter, W. M. Easter, Jr. and T. F. Wood, U. S. Patent 2,815,-381, Dec. 3, 1957
(100) Ibid, U.S. Patent 2,800,511 July 23, 1957
(101) Ibid, U.S. Patent 2,815,382 Dec. 3, 1957
(102) S. H. Weber, R. J. C. Kleipool and D. B. Spoelstra, Rec. trav. chim. 76, 193 (1957)
(103) A. Post, American Perfumer Aromat. 71, No. 3, 47 (1958)
(104) H. Horiguchi, Koryo No. 42, 14 (1956)
(105) Ibid. 47, 18 (1957)
(106) L. A. Kheifits et al., Khim. Nauka i Prom. 3, 284 (1958)
(107) Ibid. 2, 658 (1957)
(108) N. V. Belov and L. A. Kheifits, Zhur. Obshchei Khim. 27, 960 (1957)
(109) Ibid, 27, 1377 (1957)
(110) Lech-Chemie Gersthofen, Ger. Patent 876,241, May 11, 1953
(111) C. Rai and S. Dev, J. Indian Chem. Soc. 34, 178 (1957)
(112) Ibid., 34, 266 (1957)
(113) R. K. Razdan and S. C. Bhattacharyya, Indian Patent 57,541 Jan. 29 1958)
(114) J. A. Domingues, G. L. Diaz and J. Slim, Ciencia (Mex.) 16, 151 (1956)
(115) F. G. Gault, J. E. Germain and J. M. Cenia, Bull. soc. chim. France (1957) 1064.
(116) M. Bornand La France et ses Parfums, Vol. 1, No. 3, 39 (1958)
(116a) J. H. Amin, R. K. Razdan and S. C. Bhattacharyya, Perfumery Essent. Oil Record, 49, 502 (1958)
(117) G. C. Kitchens, U. S. Patent 2,842,598, July 8, 1958
(117a) Albert Weissenborn, East Germ. Patent, 9645, Apr. 7, 1955
(118) M. Ballmann and H. Hempel, Ger. Patent 928,193, May 26, 1955
(119) H. J. Riedl and H. Kroper, Ger. Patent 927,946, May 20, 1955
(119a) Hoffmann-LaRoche & Co. A.-G. Brit. Patent 765,516, Jan. 9, 1957
(119b) J. D. Surmatis, U.S. Patent 2,833,811 and 2,833,812, May 6, 1958
(120) M. Mousseron-Canet, M. Mousseron, L. Benezet and G. Igolen, France et ses Parfums, 1, No. 2, 28 (1958)
(121) S. S. Nigam and B. C. L. Weedon, J. Chem. Soc., (1957), 3320
(122) K. Kulka, Am. Perfumer Aromat. 70, No. 6, 39 (1956) 71, No. 1, 51 (1958), No. 2, 31 (1958)
(123) W. Reppe, T. Toepel and K. Klager, Ger. Patent, 868,898, Mar. 2, 1953 1958
(124) H. Hopff, H. Kuhn and U. Hoffmann, U.S. Patent, 2,822,403, Feb. 4,
(125) M. Crauland, French Patent 1,026,008, Apr. 22, 1953
(126) J. Kinngawa and M. Ochini (Takeda Pharm. Ind.) Yakugaku Zasshi, 78, 98 (1958)
(127) N. V. Polak & Schwarz's Essencefabrieken. British Patent 774,608, May 15, 1957
(127a) A. G. Arend, Perfumery Essent. Oil Record, 49, 21 (1958)
(128) Y. R. Naves, Compt. rend. 246, 1734 (1958)

"Can I try it on my husband? I don't want people thinking I was a child bride!"

COSMETIC DEPTH EFFECT

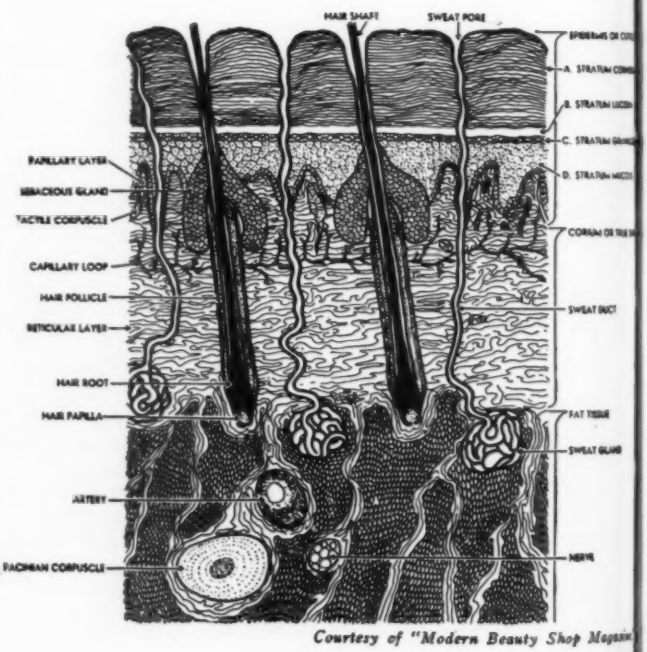
THOUGHTS & RESULTS RELATING TO THE COSMETIC DEPTH EFFECT WITH SPECIAL CONSIDERATION OF SKIN FATTING

DR. G. LIETZ*
*Dehydag, Dusseldorf, Germany

As you know, it is a chief aim of the scientific treatment of cosmetic questions to lay a scientific foundation for the cosmetic practice of manufacture and use. This is in order to achieve genuine advantages with regard to the cosmetic effects in those parts of the body where success is desired, viz. "skin" and "hair," on the one hand, and to limit cosmetic damage to a minimum on the other. It is a significant part of this endeavour—where the work of the chemist and physical chemist is joined to that of the dermatologist and physiologist—to check what statements on individual problems of cosmetic activity can be based on experiments and scientific thought. Even a hasty scanning of the scientific literature dealing directly or indirectly with cosmetic questions leads, in my view, to the recognition that the utilization and application, even of merely the assured results, to the production and daily use of cosmetic specialties, leaves something to be desired. It may be observed with some astonishment that millions of people are prepared, without great consideration, to apply to their skins, for permanent contact, cosmetic products of the most varied kinds with the most varied effects; yet they would surely make a similar procedure with other parts of their bodies dependent on a medical prescription. This behaviour can doubtlessly be explained chiefly by the fact that cosmetic effects are frequently only minute and that the healthy human skin is capable of great resistance. This attitude should not, however, free us from the obligation to repay the confidence shown to cosmetics by a serious, scientific treatment of cosmetic tasks.

It is in this sense that I have set myself the task for today's address, viz. to give you a brief, informative survey regarding the state of our knowledge of the cutaneous penetration of cosmetically active substances with a special consideration of the question of skin fatting. It is clear that I have to limit myself to stressing only a few essential points of view and to utilizing, as far as possible, nothing but certain knowledge without entering into speculative possibilities.

It seems reasonable to start with some suggestions for clearing up the formation of scientific concepts and terminology. They might serve to clarify the confusion—that may be noticed even in the scientific literature—concerning the interpretation and description of cutaneous penetration processes. For this purpose, as frequently elsewhere, the simple method seems best, by which the multiplicity of usual technical terms is reduced to their original sense and original meaning.



Courtesy of "Modern Beauty Shop Magazine"

There is a collective concept for the sum of all possible processes which may occur without a chemical reaction when a foreign substance is applied externally to the limiting surface skin. It is the concept "sorption" which originates in physical chemistry and more especially in colloid chemistry. By this term we understand the penetration of one substance into another quite generally and without implying any further statements as to the manner of this ingression, the completeness of the mutual penetration or the mode of a possible, mutual, physico-chemical combination or any phenomena causally resulting therefrom. The multiplicity of terms in the literature, like adsorption and absorption, penetration and permeability, diffusion and resorption etc. may, therefore, be subsumed under the collective concept sorption, which may be defined in precisely the way which is usual and generally understood in physical chemistry. The advantage of this procedure is evident: Firstly it is possible to classify observed facts perfectly and secondly we obtain important indications for the basic mechanism and its interpretation along with the correct classification of individual phenomena. In this way the following scheme is arrived at:

Sorption: Collective concept for all processes during which externally applied foreign substances penetrate into the skin. This implies no further detailed assertions about any special, individual processes which may be connected therewith or occur as a consequence thereof. The concept sorption, which is incidentally largely synonymous with the more current expression *absorption*, asserts nothing about the place where or the completeness with which the foreign substance is taken up.

Penetration: literally means the action of piercing through; here its sense is, in any case, a deeper penetration of the foreign substance into the skin i.e. beyond the natural pores and especially beyond the hair follicles and the skin gland outlets but, according to my suggestion, without participation of the skin cells or the circulation.

This latter process, which refers to the complete penetration of the skin as a barrier, is reserved for the expressions

Permeabilitation and Resorption. The permeating processes may for practical purposes also be considered as Diffusion. Permeating substances, therefore, overcome the cell membrane and participate in the metabolism of the cell. They are introduced into the circulation as by a lock—i.e. they are genuinely resorbed—and are excreted more or less completely, changed or unchanged, in the usual manner.

Finally we must illustrate the important concept

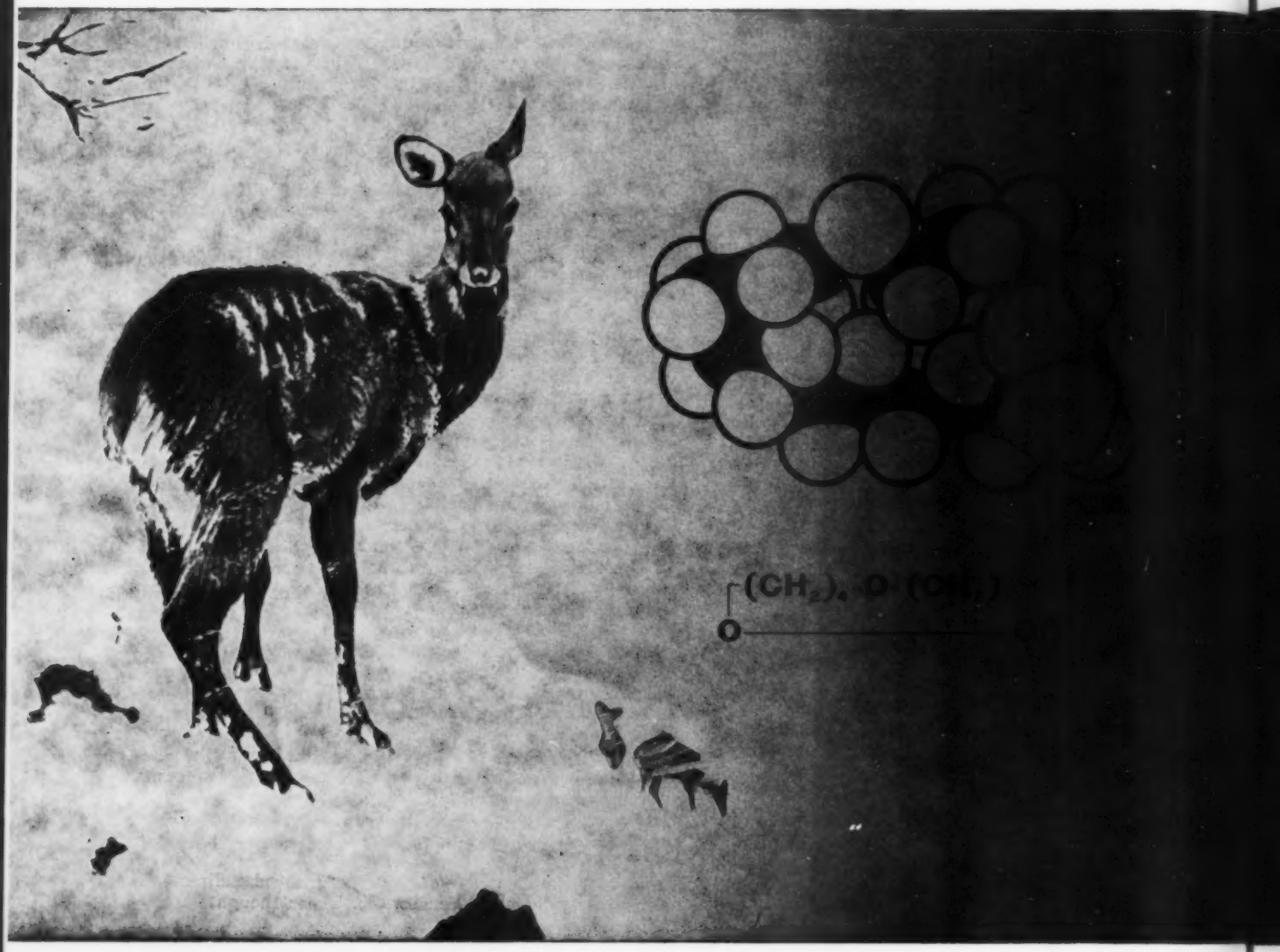
Adsorption, strictly in accordance with the terminology of colloid chemistry, as the enrichment of the foreign substance in the boundary layer of the phases, that is, for instance, at the cell membrane and other discrete, structured phases but also in emulsion systems, for example, at the boundary layer between the dispersing and the dispersed phase. The adsorption process, as you know, is typical for surface active substances of polar structure. Its reversal, the impoverishment of a substance in the boundary layer, may be described as negative adsorption.

The correct usage of the suggested terms for sorption processes on or in the skin should, in my view, also be capable of serving as a useful and welcome means of communication between the chemist on one hand and the medical man and the biologist on the other. It seems to me worth discussing this matter, particularly in this gathering and in conjunction with the appropriate medical societies (DGAM).

In order to be able to estimate on the one hand the justification for the definition given, and on the other hand the possibilities of sorptive processes in the skin as an organ, it will be opportune to occupy ourselves briefly with some basic facts and ideas. Historically it must be mentioned that Fleischer(1) in 1877 still considered the intact skin as completely impermeable, even for gases. In 1904, however, Schwenkenbecher(2) showed that the skin is permeable for gases and lipoid soluble substances, but virtually impermeable for water and electrolytes. These and similar observations led, in the main, to two theories of "transepidermal sorption" which were suggested approximately simultaneously around 1924 by Rein(3) and by Meyer and Overton(4). Rein considers the stratum lucidum, which lies between the horny layer and the germ layer (stratum germinativum, rete Malpighi), as impermeable for polar molecules and in particular for electrolytes. This is due to its genuine character as a membrane which, by selective anion-cation-adsorption, leads to the formation of electric double layers and consequently to a sieve effect. This cell layer, within which Rein also includes the stratum granulosum, is in the "isoelectric state" at a pH of 4.5 to 5 and does not, therefore, allow any water to pass through. By this tear-off method Szakall(5) was able to insulate the stratum lucidum from the living skin and to demonstrate its particular powers of resistance. Rothman(6) regards as a supplementary proof the behaviour of the frog skin which does not have this layer and which is freely permeable to water in the dried state. The significance of the phase distribution coefficient, which has been taken over from the narcosis theory of Meyer and Overton, is nowadays regarded as a complement to Rein's ideas. It certainly plays an important part in percutaneous sorption, even though the conclusion that lipoid boundary layers are completely hydrophobic, would take us too far. In connection with this there are the results of Starkenstein(7) and his collaborators who in 1936 proposed the theory that lipoid soluble substances permeate easily, because the skin-cell membrane is supposed to have a sterin-phosphatide structure. Any disturbance of the native structure of the membrane, be it by solvation or by coagulation processes, is said to increase the permeability of the cell wall and indirectly for water soluble substances, too. These thoughts are, after all, in accordance with basic, colloid-chemical results about gel structures.

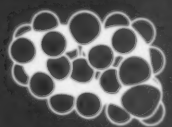
With regard to our question for the basic conditions for sorption processes in the living skin some other, important aspects have to be considered, partly of a histological-structural and partly of a functional and applicational nature. As we know, the topography of the human skin is full of chasms, cracks and pores, for which reason we talk quite simply of the natural "porus" of the epidermis. It is, therefore, to be expected that capillary forces must play a part during the penetration of foreign substances and that we are able to influence these capillary forces in the well known manner which I will further specify below. In the first place it is remarkable that the horny layer—regarded as a substance—has no special influence on sorption processes. Although dyestuffs may, for example, be bound adsorptively by keratin (as we know from the dyeing of skin and hair), yet the penetration via the capillary ducts is hardly influenced by the thickness of the horny layer; as could be shown, for instance, with ichthyosis vulgaris. Conditions are naturally different when the horny layer is attacked or destroyed by keratolytic agents, e.g. salicylates—but here we leave the normal condition of the

NATURE'S MIGHTIEST LAW IS CHANGE *(R. Burns)*



"Naarden" the foremost name in aromatic essences, has developed a world-wide international research organization to study the origin and changes of essences for the creation and improvement of perfumes derived from flowers and fruit. Central co-ordination of this dynamic research program will now be conducted by the recently completed main "Naarden" laboratory in Holland. "Naarden" laboratories throughout the world will channel reports of their independent research activities to this modern, scientific headquarters.

CERVOLIDE
Cervolide is the new "Naarden" musc body developed by "Naarden" s fragrance experts, and awarded highest rating by the Test Board of Perfumery. Cervolide, a complete ring lactone, permits a universal application of the heretofore precious musc scent, both on a practical and a low cost basis. Watch for further details about this important new development in the March issue of "Naarden News".



"Naarden" nearest to nature!

Naarden-Holland, P. O. Box 2, Bussum.

skin, which alone is interesting from the cosmetic point of view. The follicular and glandular apparatus, however, is of great importance for percutaneous absorption. Almost all foreign substances can, in the first place, reach the sebacic glands via the hair follicles without having to penetrate interfering layers of epithelium. The permeability of the sebacic cell is doubtlessly much greater than that of the intermediate epidermal layers, and this certainly applies in a similar manner to the follicle walls. Rein and in particular MacKee, Sulzberger and Herrmann (8) (1945) have shown how penetration takes place via the horny layer-follicle, aperture-follicle and from there via the sebacic gland and the follicle wall. Thus the corium is reached without piercing and the epidermis barrier from either above or below. Similar conditions are said to apply to the ducts of the sweat glands; it is striking, however, how poor are absorption conditions for palma manus (and planta pedis), which are so rich in sweat glands. Several authors were able to show that for instance dyestuffs allergenes, and histamines penetrate particularly badly here. It has also been known for a long time that metallic mercury—which is easily absorbed by the hair follicle—may often be found at the sweat gland outlet, but only rarely in the gland duct and never in the sweat gland itself.

From a functional point of view we must now consider the physiological, aqueous-lipoidal surface film, which covers the skin, with individual variations as to amount and composition, and which is of importance for sorption processes. This lipoid film derives from two sources: the apocrine sebacic glands (whose secretion is often, and particularly in the Anglo-Saxon literature, referred to as the "sebum") and the keratinising processes of the upper layers of the epidermis, especially the horny layer itself. Of the complex, chemical composition, whose details would take us too far here, the fatty portion is of particular interest in connection with our topic. Its composition is in principle different from the natural food fats and from the subcutaneous depot fats which consist, as you know, almost exclusively of triglycerides. In the functional fat of the skin, on the contrary, we find, in addition to minor quantities of triglycerides, mainly large proportions of free, homologous fatty acids, high molecular wax esters, cholesterine fatty acid esters besides free cholesterine and also special hydrocarbons, particularly squalene (5 — 12% $C_{30}H_{50}$. It is interesting that this functional skin fat takes up water with fair ease, and it can be shown that the wettability of the skin is worse after thorough washing or fat extraction than before. For this reason the lipoid film was formerly overvalued as a barrier against water and electrolytes. The presence in the secretion of the skin of the biologically so very interesting phospholipoids is of the greatest importance for the actual, physiological processes. The phospholipoids are substances whose vital functions in the building and the metabolism of the cell have been known for quite some time. There are close, mutual relations between them and the sterines. The phospholipoid content of the total skin of the adult mammal (pig) is around .8% of the dry weight; in the basal layer of the epidermis, however, more than three times this amount, viz. 2.6% has been found. The horny layer itself, on the contrary, contains only .14% phospholipoids and this decrease from the living to the dead cell layers of the epidermis corresponds precisely to the histological findings about mitochondria. Briefly, summarising the state of our present knowledge it may be said that the phospholipoid-sterine proportion is of vital importance for the physiological colloidal structure of the protoplasm, and that this proportion is decisively changed in the course of the keratinising processes in the epidermis. During keratinisation about half the total sterines disappear, while the phospholipoid content falls simultaneously to about a twentieth. This is a process that must be regarded as quite characteristic in general for the dying away of living cells. Marginally it may be noted that, on the contrary, young tissues, particularly embryonic but also fresh tissues in wounds and especially cancerous tissues shows a considerably higher phospholipoid content than normal tissues. The decomposition of the phospholipoids results in the apperance of cleavage products like choline and free fatty acids, which are themselves subject to further decomposition but are also available for renewed synthesis, by being esterified once more with cholesterine, wax alcohols etc. In view of these complicated biological processes, what a nerve to talk of the specific effect of an external fat supply to the skin!

Having briefly glanced at the importance of the structural and functional, physiological data, it remains to be mentioned that the so-called applicational components also play an important part in sorption processes. Almost all authors confirm that water has the property of promoting penetration. This property makes a particularly impressive appearance with lipoid soluble substances, as was, for instance, shown by Moncorps (9) as long ago as 1929 for salicylic acid. If it is true that here an important part is played by the wetting conditions at the solid/liquid interface and by the binding of water by the lipoid film with its hydrophilic properties, then it becomes immediately apparent why the application in emulsion form is so particularly effective. Rothman (10) and other authors assume here that the capillary active properties of the emulsions promote only the introduction, as by a lock, of the effective substances into the porus, aided by the displacement of the air content by exchange adsorption. They do not, however, become effective for permeation into the skin cell itself nor, consequently, for a subsequent resorption. With every due care and with many limitations, it may be generally assumed that the penetration through the porus increases from the non-aqueous rubbing in of fat via W/O and O/W emulsions, aqueous gels and up to true solutions, at least insofar as reactive processes are excluded. Mechanical measures, such as vigorous massaging in, may have a minor, promotional effect. The promotion of hyperhemia of the corium by specific effective substances —not infrequently demanded cosmetically—is virtually ineffective, since it is purely a measure to accelerate resorption when the passage to the base of the vessel has already taken place.

When we come to put the question as to the possibility and the value of an external, cosmetic fatting of the skin, we can, from the physiological conditions indicated, draw a number of reliable conclusions, whose power of proof is supported by numerous experimental results. The traditional, empirical supposition that natural animal and vegetable fats and oils—i.e. triglycerides like lard, olive and almond oil etc.—can penetrate the intact epidermis particularly easily and with cosmetic and therapeutic advantages, this supposition is obsolete and has, in particular, no connection with the functional fat metabolism of the epidermis. Harry (11) in 1941 showed that animal, vegetable and mineral oils and fats do not penetrate the intact epidermis to any noteworthy degree, at any rate no deeper than about a third of the horny layer, findings that have since been confirmed by many research workers. His results were based on numerous experiments on fresh preparations of human skin and on living pigs, rabbits and rats, with the aid of dyestuff markings and by measurements of fluorescence. Barail and Pescators (12) in 1949, for instance, obtained the same results with cold cream USP XIV which contained C^{14} as a tracer. As mentioned earlier, it is at best

only the porus that is filled. Most authors, however, agree that it is possible to recognize distinct differences with regard to chemical structure and origin of the fats and fat-like substances. Speakman(13) had already shown in the case of textile fibres, chiefly wool, and also for leather that fatty chains with a polar structure penetrate better than non-polar triglycerides, let alone hydrocarbons. It is for this reason that animal skins, for example, cannot be "stuffed" with mineral oils, while it is easily possible to do so with fatty alcohols and sulphated fats. Jäger(14) talks directly of a polar anchoring onto the keratin, when paraffins may be bound conjointly by way of the lipophilic hydrocarbon chains, especially if the system is finely emulsified by fatty alcohol sulphates. Indeed, a kind of dragging-along effect will quite generally have to be ascribed to the ion-active dispersing agents. It has also long been known that fatty alcohol sulphates form a kind of molecular compound with native proteins, and for this reason develop a certain substantivity towards skin and hair. Further, differential results on the depth effect of external skin fatting refer to the physical properties of matter like melting point, cohesion (toughness), fluidity and creeping power (film-forming properties) etc. The different authors agree more or less in listing a kind of series of decreasing penetration, which ranges from essential oils via oleic acid and oleyl alcohol, their liquid wax esters and analogous substances to the glycerides and thence, at a considerable distance, to hydrocarbons. Schmidt-LaBaume(15) has reported on the good penetrating properties of the oleyl ester of oleic acid on the basis of dyestuff diffusion and washing experiments. A special note must be devoted to wool grease and its cosmetic use. Although it cannot be denied that wool grease is a physiological secretion of the sheep and contains substances that are also secreted by the human sebacic gland, this circumstance alone would hardly be able to establish its universal cosmetic use. As far as penetration goes, wool grease is among the last; and Bliss(16) showed as long ago as 1934 that therapeutic substances for the skin, incorporated into wool grease, are transferred with particular difficulty. Wool grease allergy is well known to dermatologists and its tough and sticky nature is subjectively felt to be rather disagreeable. We have already been able to explain in detail that, as a matter of principle, there is no relation between wool grease and all other fats that are offered in cosmetics and the lipoid metabolism of the epidermis. If we now, as in the past, nevertheless find wool grease and wool wax in numerous cosmetic preparations, this fact can objectively only be explained by the excellent properties of the wool grease fatty alcohols and cholesterine esters as W/O emulsifying agents. They are, in fact, hardly excelled in this respect even nowadays apart, perhaps, from a few synthetic products which were modelled on them. Even so, the W/O emulsions are in general inferior to the O/W emulsions with respect to their penetrating properties because they lack the surface active properties of ionic emulsifying agents and because they represent a two-phase system with a more mechanical structure. That is also the main reason for the considerably smaller heat stability of W/O systems which break down easily with the strong reduction in viscosity.

If, as a result of the findings of general and specialized research, one acquires a certain critical attitude towards the external, cosmetic use of fat, we must nevertheless pose the question as to what genuine cosmetic effects can be credited to the use of the widespread and traditional fatty creams. I believe that this question may be answered fairly acceptably in this way: the purpose of the use of these creams is mainly prophylactic. No kind of interference—in the present state of our knowledge a completely occult one—into physiologico-biological, epidermal processes can be aspired to. On the contrary, it is the highest aim of the relevant cosmetic measures to maintain the physiological, i.e. the healthy state of the skin. This maintenance of a healthy, youthful and fresh appearance of the skin can, in my view, be attempted in two ways and may, more or less, be achieved:

1. By the protective action of a fatty film against the effects of harmful influences in the surroundings.
2. By smoothing the skin optically, which is subjectively felt in the sense of cosmetic make up.

if, in the first instance, we disregard the possible therapeutic effects achieved by the use of certain active substances. We must in any case decline, as a matter of principle—and this has already been pointed out by Janistyn(17)—to talk of fatty nutrition of the epidermis in connection with cosmetic skin fatting. Names like nourishing cream, skin food or tissue creams sound well, but are misleading insofar as it is a question of fat supply in, for instance, the sebostatic skin type. The keratinisation process of the cells of the upper layer of the skin is a physiological process that cannot be influenced cosmetically. Besides its protective action against harmful influences from the surroundings, we must allow that cosmetic skin fatting has a certain importance as regards the maintenance of the water equilibrium of the epidermis. We know, after all, sufficient to say that the processes reducing the swelling (dehydration)—to which the protein gel "skin" is subject in the direction from the base layers towards the horny skin—are of basic importance not only for cosmetics, but also for the proper functioning and the powers of resistance of the epidermis. This and other questions connected with it were discussed at length quite recently at a special symposium during the XIth International Dermatological Congress in Stockholm, cf. Szakall(18). It is the physiological gel condition that decisively influences the turgescence of the skin, its topographical structure and its resistance to the penetration of foreign substances and germs. It may well be that hydrated fatty films, which may also contain hygroscopic additions in correct amounts, are suitable for maintaining this condition. The defence against unfavourable climatic factors is of particular importance here; this, among other matters, could be shown by control examinations over many years on a large number of people at our factory: trade damage apart, it is the dominating influence. The question of the raw materials composing the fatty, cosmetic film is, of course, also of importance. Since a physiologic-biological fatting effect lies beyond the realm of possibility, we should at least strive, as far as possible, to limit the amount of fatty substances foreign to the skin and to include preferably those which are close to or related to the skin. By the expression 'foreign to the skin' we understand first and foremost mineral oil products; by 'close to the skin' we mean, for example, high molecular wax esters—naturally suitably prepared and in a state fit to be administered. Materials of rare and exotic origin, such as turtle oil and the like, may be forsworn altogether; their use is worthy of an Indian medicine man but not of a cosmetic practitioner working on scientific lines.

In connection with the question of special, active substances, which are preferably used in the lipoid phase, permit me to say a few words about hormones, vitamins and essential fatty acids. The use of hormones, particularly those of the oestrogen type, as well as of vitamins in cosmetic creams is familiar and well liked. The effect on the public is doubtlessly largely due to the fact that the vital importance of these active substances for the regulation of the organism is generally known. As is so

frequently the case, the conclusion that their external, cosmetic use, too, should be of advantage is arrived at by simple transference—always effective in matters of mass psychology. Two things should, however, be considered here. Firstly the sufficiently well illustrated fact that there can scarcely be a question of a provable, resorptive, systemic effect and secondly the necessity, especially with hormones, of keeping the dosage sufficiently low to exclude with certainty any unwanted and possibly even dangerous side effects. Putting a very fine, academic point on it, one might say: Nothing but a guaranteed ineffective hormone application is cosmetically tolerable. Still, some cosmetic effects, when extracts of organs rich in active substances are used, may be occasionally observed, especially with aged skins; they are, however, locally limited and subside when medication ceases. As far as dosage goes, Harry(19) believes that about 300 IU of oestrogen active substances per gramme may be admissible, a quantity that was also considered safe by the American Food and Drug Administration 1949. Similar, though more harmless conditions apply to vitamins. Here we find in the first place the most familiar representatives like vitamins C (anti-scorbutic factor), D (anti-rickets factor, in cod liver oil), E (anti-sterility factor, in wheat germ oil) and quite recently also pantothenic acid (growth factor) in cosmetics for external application. They are all well tolerated by the skin—and as far as penetration is concerned, it takes place according to the possibilities outlined. The so-called essential fatty acids, in the first place the linoleic/linolenic acid system and arachidic acid, are no longer counted among the vitamins. Their cosmetic use is connected with their therapeutic application in the realm of wound healing where, to be sure, things have become rather more quiet lately. They do not appear to possess fungistatic effects, as may be seen with undecylenic acid, so that their cosmetic use seems, on the whole, somewhat problematic.

As a result of these somewhat more fundamental investigations into the sorption processes of the intact skin, we should like to formulate and bring out the essential thoughts and the resulting requirements for a scientifically founded view of the cosmetic application of fats:

1. Clarity and order in terminology and the posing of problems. Adjustment of the manner and method of application to the biostructure and the physiological mode of reaction of the skin.
2. Limitation and emphasis on genuine, cosmetic possibilities whose effects can be controlled as opposed to an empirical officiousness.
3. Expert selection of raw and auxiliary materials so as to avoid any cosmetic damage.

The continuous observation and the optimum fulfilment of these basic requirements will take us nearer to the high aims of cosmetic science.

Literature

(1) Cf.e.g. in Bethe (Handb. d. norm. u. path. Physiol. 4,107 u. 18,85—1932)
(2) Schwenkenbecher (Arch. Anat. u. Physiol. 1904, 121)
(3) as given by Rothman (Physiology and Biochemistry of the Skin, Chicago 1954, 27)
(4) Overton (Studien über die Narkose, Jena 1924)
(5) Szakall (Fette u. Seifen 53 (1951)399)
(6) Rothman (loc. cit. S. 29)
(7) Startkenstein, Hendrysch (Arch.f.exper.Path.u.Pharmakol. 182(1936)664) Matschak (loc. cit. S. 688)
(8) Mackee, Sulzberger, Herrmann, Baer (J. Invest. Dermat. 6 (1945)43)
(9) Moncorps, (Arch.f.exper.Path.u.Pharmakol. 141(1929)50)
(10) Rothman (loc. cit.)
(11) Harry (Brit.J.Derm. March 1941 cf. also Modern Cosmetology, London 1955)
(12) Barail, Pescatore (Drug Trade News 41, 1949)
(13) Speakman as given by Harry (Modern Cosmetology, London 1955 S. 85)
(14) Jager as given by Czetsch-Lindenwald, Schmidt-LaBaume (Salben, Puder, Externa, Berlin 1950)
(15) Schmidt-LaBaume, Lietz. (Die Emulsionen in der Hauttherapie Stuttgart 1951)
(16) Bliss (Drug Cosmet. Ind. 1934, 247)
(17) Janistyn (Riechstoff, Seifen, Kosmetika, Heidelberg 1950, Vol. II, p. 359)
(18) Szakall (Berufsdermatosen 6,1958,93)
(19) Harry (loc. cit. S.100)

STRUCTURE OF THE HAIR

GAVERN T. WALKER

Hair is composed of keratin and belongs to the fibrous proteins. Included in this class are myosin of muscle; fibrin of clotted blood, fibroin of silk; collagen of cartilage; and, of course, the keratin of hair, horns, and feathers.

As a result of his X-Ray diffraction studies, Astbury[1] was able to classify the fibrous proteins into two groups: 1. the keratin-myosin-fibrinogen group (known as the k.m.f. group), and 2. the collagen group. In this article, we shall be concerned mainly with group 1, since our interest lies, on this occasion, in the keratins.

In the k.m.f. group of fibrous proteins, we find the proteins of the epidermis of mammals, amphibians, and certain fishes, of the fibrous structures which grow from mammalian epidermis (e.g. hair), of muscle fibre (the myosin complex), of fibrinogen, the blood-clotting protein, and of bacterial flagella. It is of the greatest importance and interest that all these proteins give the same X-Ray diffraction patterns as that of natural, unstretched mammalian hair. These keratins are known as α-keratin.

If α-keratin is stretched while immersed in hot water or in dilute alkali, it assumes the β-keratin configuration, and the X-Ray diffraction pattern changes accordingly. The β-keratin is approximately double the length of the α-keratin from which it was derived. This stretching operation is reversible; release of the stretched fibres in a gradual manner results in a contraction of the β-keratin fibres to the α-form.

Not all the natural fibrous fibres exist as α-keratin. Silk fibroin and feather keratin, for example, both exist as β-keratin.

It is necessary to point out that it is very difficult indeed to purify these fibrous proteins. They do exist, however, in a fairly homogeneous state. Since, moreover, they are notoriously insoluble materials, impurities in them may be removed by washing with various solvents. Surface fatty matter, for instance, may be removed with the aid of organic solvents.

In view of the difficulties in investigating the intact protein, the actual molecular structure of these fibrous proteins has been limited to either the physical investigation of the intact fibres or the analysis of the amino acids resulting from complete hydrolysis of the fibres. The emphasis in this article will be placed on the physical examination of the intact fibre, and the configurations of α-keratin and of β-keratin will be discussed in the light of recent work. The structural pattern of β-keratin will be considered first, since this protein presents an X-ray diffraction pattern which is not as difficult to interpret as that of the α-keratin.

It has now been unequivocally demonstrated, principally by Astbury,[2] that β-keratin is a zigzag type structure of fully-extended polypeptide chains (Fig. 1). This kind of structure is found, not only in β-keratin but, also, in silk and fibres prepared from globular proteins after

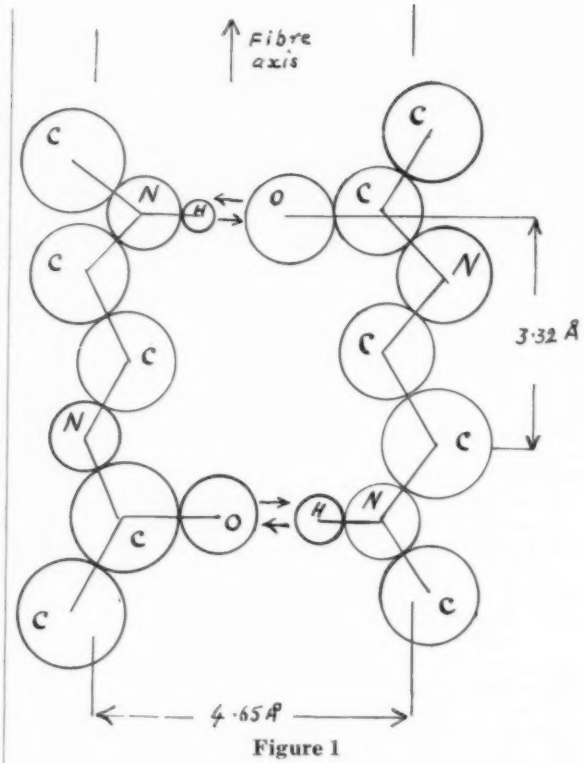


Figure 1

they have been denatured. In figure 1, the adjacent chains are linked together by hydrogen bonds in the plane of the paper, while the grids themselves are separated by various types of side chains which may be considered as being in a direction perpendicular to the plane of the paper. The hydrogen bonds are formed between neighbouring NH and CO groupings. It is important to realise that, in the β-keratin, these hydrogen bonds do not contribute to the actual internal organisation of the polypeptide chain (as is the case in the α-keratin), but act in an intermolecular fashion, linking together two chains.

The pattern of β-keratin has received most careful examination and the analysis of it depends chiefly upon the spacing of diffraction spots on the meridional axis and on the equatorial axis. From the spot spacing along the meridional axis, we may calculate the length of the repeating unit of the atomic pattern along the axis of the fibre. This repeating distance amounts to 3.3Å. Similarly, the spacing along the equatorial axis are found to be 4.65 and 9.8 A. The two last mentioned spacings are perpendicular to the fibre axis; in addition, it was found that if, during stretching of the fibre, lateral compression was also applied, then these two spacings were also perpendicular to one another.

If we take into account the various interatomic distances in simpler organic crystalline compounds, it is found that the three spacings mentioned above are very close indeed to those expected in a rectangular three-dimensional array of fully-extended polypeptide chains which are orientated along the axis of the fibre. Springhall[3] has stated the position very lucidly: "The value 3.3Å for the spacing along the fibre axis is close to the value expected for the distance along a polypeptide backbone between equivalent points in adjacent amino-acid residues in a full-extended polypeptide chain."

Corey[4] analysed crystal-structure data on a number of compounds, such as glycine, alanine, glycylglycine and

diketopiperazine, and reported that a value of 3.64Å should be expected for the fibre axis spacing. He suggested that the discrepancy of 0.34Å might arise from the fact that the polypeptide chains in the β-form do not become fully stretched.

In the extended zigzag chain, we find that, because of the identity of configuration among the natural α-amino acids, the R side chains of the amino acids project above and below the actual plane of the zigzag. The distance between two such side chains, measured along the fibre axis, both side chains projecting either above (or below) the plane of the zigzag, should be about 7°A. (see Fig. 2).

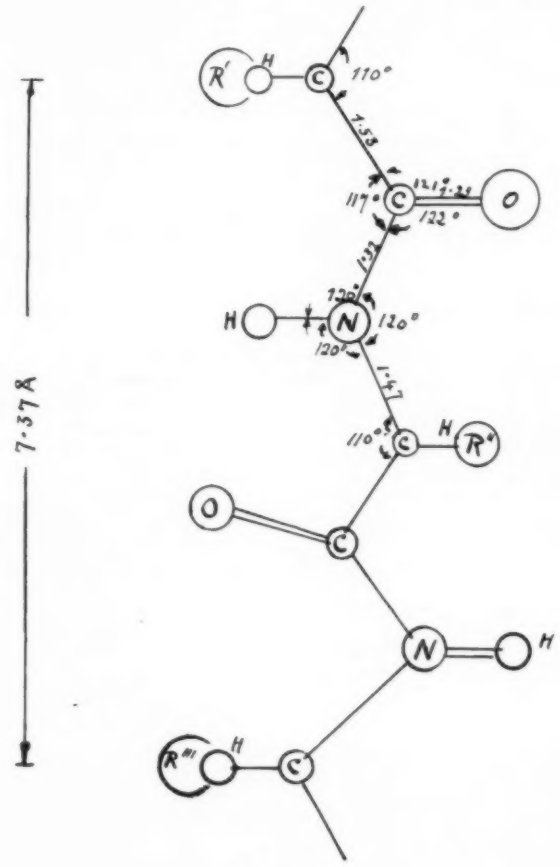


Figure 2

With regard to the 4.65°A spacing, this is a value close to that expected for the spacing between two fully-extended zigzag chains, with axes parallel and with zigzag coplanar. The chains are linked by hydrogen bonds of type O . . . H-N, with bond length of approximately 2.8Å (Fig. 3).

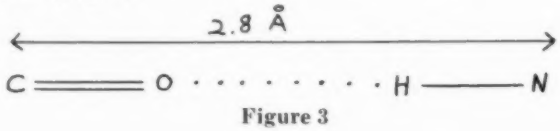
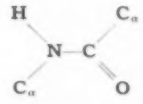


Figure 3

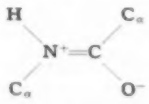
The 9.8Å spacing corresponds to that expected for the spacing perpendicular to the zigzag plane between two adjacent polypeptide chains, lying parallel to one another, and maintained by bonding such as salt linkages, disulphide cross-linkages, etc. An interesting observation made by Astbury and Lomax,[5] confirmed the fact that the 9.8Å spacing arises from R.....R interaction, since these workers found that, when the fibre absorbs moisture, the 9.8Å spacing increases to 11Å. This spacing is the only spacing to be affected by water absorption in the fibre.

Pauling and his co-workers,[6] in a masterly series of papers, have summarised the conditions necessary for a polypeptide structure. These conditions may be stated thus:

1. All the amino acid residues are equivalent; only the side chain, R, differs.
2. The system



is always planar. This is due to resonance with



3. The bond lengths and bond angles are as shown in Fig. 2.
4. Every NH and every C-O group is linked together by hydrogen bonds. The O←→N distance being 2.72Å, and the O→N vector being within 30° of the N—H bond direction

As a consequence of much further work, Pauling and his co-workers postulated a 'pleated sheet' structure for β-keratin. This structure reproduced accurately all the dimensions arising from the X-ray analytical work, and is shown in Fig. 4.

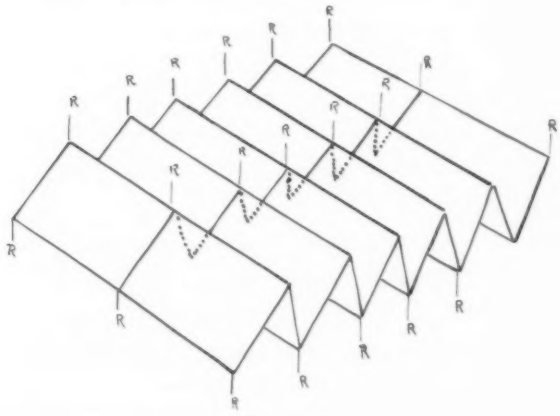
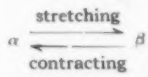


Figure 4

We may say that the structure of the β-keratin is now almost settled, although certain minor problems remain to be solved.

The structure of α-keratin is exceedingly complex, and its resolution is by no means complete. We may here remind readers that natural, unstretched hair exhibits the α-keratin type of structure; hence the interest of cosmetic chemists in the keratin.

Since we have the relationship



such transformation must imply that the fully stretched polypeptide chains must, on reverting to the unstretched state, fold. Now the X-ray analysis of α-keratin shows

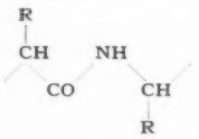
up three characteristic spacings, as follows: a spacing of 5.15Å along the axis of the fibre, and two spacing perpendicular to the axis, of value 9.8Å and 4.65Å. How are these spacings to be interpreted?

We found that the spacings for the β-keratin were 3.33Å along the fibre axis, and 4.65Å and 9.7Å. In other words, while the axis spacing changes from 3.33 to 5.15Å, as one goes from the β-keratin to the α-keratin, the two perpendicular spacings are, on the contrary, unchanged. In order to account for this, in the simplest way possible, we may postulate that the folding occurs in the plane of the zigzags of the fully-extended chains.

In an important paper published in 1950, Bragg, Kendrew and Perutz[7] considered possible helical models having two-, three-, and fourfold axes of symmetry and pointed out that the following considerations should apply:

1. The apparent repeat distance must be just over 5Å.
2. It is most unlikely that there are more than four amino acid residues in the 5Å repeat distance in the α-fold.
3. The assumption is postulated that there must be an integral number of residues per turn of the helix.

In addition, these three workers stated that, in their opinion, structures in which all the C=O and HN groups are involved in intramolecular O . . . H———N bonding are more likely than those in which only a small number of these groups are involved. Subsequent work has shown that, in the α-keratin, the helix is held rigid by hydrogen bonds of the intramolecular type. The condition that there must be an integral number of amino acid residues per turn of the helix was rejected, however, by Pauling, Branson and Corey[8] in an important series of papers. These workers laid particular emphasis on the rigid stereochemical requirements of the



system. They also insisted on the fact that there was no special point in the idea of an integral number of turns, as was mentioned above. They laid stress, also, on their previously cited essential conditions for a satisfactory polypeptide structure.

Two possible models for the structure of α-keratin were possible from the work of Pauling and his collaborators:

a) A structure which possessed 3.7 amino acid residues per turn of the helix, in which each N-H is hydrogen-bonded to the C=O of the third residue beyond it along the chain (see Fig. 5).
b) A structure having 5.1 residues per turn, in which each N-H is hydrogen-bonded to the C-O of the fifth residue beyond it along the chain.

Later work by Pauling[9] ruled out the (b) configuration on grounds of molecular destabilization due to the unfavourable orientation about the N-C and C-C carbonyl bonds which such a structure would demand.

It seems fairly certain that the configuration of the α-keratin chains must approximate closely to the 3.7 helix. Evidence has accumulated which suggests strongly that the Pauling 3.6 or 3.7 residue helix is the only model so far propounded which explains the strong reflection from planes perpendicular to the fibre axis at 1.50Å, found by Perutz. This 1.50Å spacing is to be expected from the Pauling model since it is the spacing

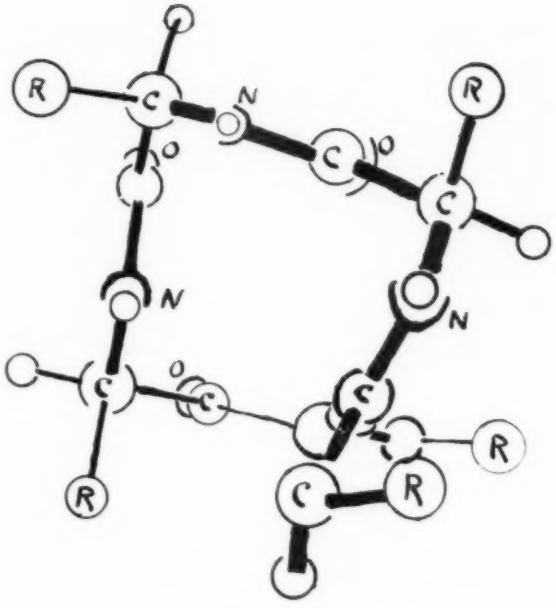
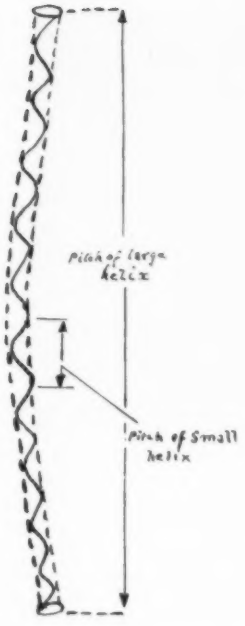


Figure 5



The compound α-helix

Figure 6

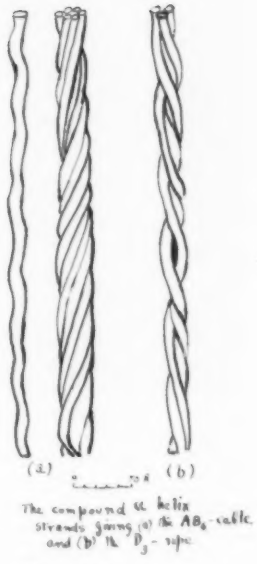


Figure 7

between planes, perpendicular to the axis of the helix through corresponding points of adjacent amino acid residues.

The general requirements of the 3.7 residue helix are met by a structure having a repeating unit of exactly eighteen residues in five turns (making 3.6 residues per turn). However, there are three main objections to this configuration:

1. It did not easily account for the observed 5.2Å spacing along the fibre axis.
2. The observed value of the density of wool α-keratin is 1.3. The value calculated for the 3.6 residue helix is, however, only 1.15.
3. Astbury and Street[10] found a strong equatorial reflection, corresponding to a lateral spacing of 27°A. Pauling's simple helix does not account for this spacing.

These three objections apply to the simple 3.6 helix of Pauling and co-workers. These difficulties were overcome, however, in 1953, when Pauling and Corey[11] and, independently, F. H. Crick,[12] postulated the 'coiled coil' configuration. Due to systematic variation, along the helix, in the length of hydrogen bonds, within the permitted range 2.80-0.12Å, caused by regular variation in amino acid environment, the axis of the α-helix becomes itself helical, with a large pitch (compared to the pitch of the primary helix). The resulting helix, shown in Fig. 6, is known as a compound helix. Although it is rather difficult to predict the actual value of the pitch of the compound helix, the likely value is probably within the range 200-400Å. The radius of the compound helix becomes equal to the order 6-10Å.

It is worth noting here that a helix is sometimes referred to as a spiral, but this is not correct. A spiral winds around a cone, while a helix winds around a cylinder, in the same way as a winding staircase.

Pauling and Corey demonstrated further that, assuming a radius of 10Å for the large helix, it was possible to twist six compound helices about a single straight helix, to give a seven-stranded cable, called an AB_6 cable (see Fig. 7). Furthermore, it was shown that, assuming a radius of 6Å for the compound helix, three compound helices could twist together to form a three-stranded rope, called a D_3 rope.

One very interesting consequence of the AB_6 cable is that, since such a cable would have a radius of about 30Å, a fibre composed of such cables would exhibit an equatorial reflection of approximately this spacing; this is near to the 27Å spacing found by Astbury and Street. Fig. 8 shows the packing arrangement of these AB_6 cables, and it will be noticed that in the interstices between them, there is room to accommodate single compound α-helices, C, in the figure. The repeating unit is, therefore, 1 AB_6—2 C chains, perpendicular to the axis of the fibre. If, now, the density of a hexagonal unit of this structure, 30Å in diameter and 1.5Å in length, containing nine amino acid residues of average residue weight 112-5, is calculated, it ranges from 1.2 to 1.3, in very good agreement with the observed value for wool of 1.3.

In addition, the AB_6 cable accounts well for the observed 5.2Å spacing along the fiber axis.

Pauling and Corey[13] have assigned to feather keratin

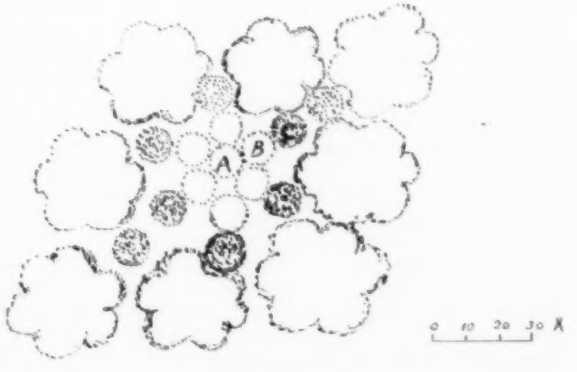


Figure 8

the structure AB_6, $2D_3$. Although there seems to be little doubt that the 3.6 or 3.7 structure of Pauling and his co-workers is the basis of the structure of α-keratin, it is not yet certain whether it is the most satisfactory structure so far propounded. In this connection, a recent modification has been suggested by Maurice L. Huggins.[14] Huggins proposes, as a first approximation, close-packing of right-handed polypeptide helices, with the distances between the helix axes about 9Å. He then suggests that these helices do not twist spirally around a common axis, as Pauling proposed, but are grouped into triplets, with the residue sequence patterns in each helix shifted and rotated, relative to its two neighbours in the same triplet, in such a way as to place equivalent residues around a 3-fold screw axis—called by Huggins "the triplet axis". In his book "Physical Chemistry of High Polymers",[15] he writes concerning these triplets: "the interchain packing within each triplet would be expected to be more efficient than between chains of different triplets; hence the distances between chain axes within each triplet should be somewhat less than the distances between adjacent chain axes of different triplets." Huggins has developed and extended his ideas to include what he calls "nonets" or "triple triplets" which are, in effect, triplets grouped around 3-fold axes. We quote again from Huggins: "The principle that like groups tend to be surrounded in like manner gives two possibilities, with regard to the chains closest to the nonet axis: (1) like residues may be at the same level, or (2) like residues may be arranged in regular spirals around the common 3-fold screw axis. The latter alternative would give better packing." The actual unit of structure contains 81 chains in three groups (equivalent to one another) of 27 chains each. The equatorial spacings of the X-ray picture are accounted for very well by Huggins' structure. For a fuller discussion of this structure, reference to the original paper is essential.

It is of interest to note that breakdown of the α-helix is induced in some polypeptide solution by change in pH. At pH 5, for example, a polypeptide solution was found to contain about 90% of the α-helix, whereas increasing the pH to 7 resulted in a decrease of helical organisation to less than 10%. Obviously, this phenomenon must result from disruption of hydrogen bonds at a certain critical pH value, depending on the particular polypeptide.

Hirsch,[16] in a number of interesting papers, has reported his work on the structure of hair keratin, using the hair balance. He finds that hair which is subjected to stretching undergoes a rotatory motion, and Hirsch considers that this rotation may be related to the spiral configuration of α-keratin fibres. Heilingoetter[17] is of the same opinion, although his own data is of extremely doubtful validity. Dr. Hirsch, in a personal communication to the present author, has been kind enough to summarise his own views on the possible correlation between the Pauling structure of α-keratin and the load-rotation work. Before we discuss this aspect of the matter, it would be as well to emphasise that Hirsch's work may well be explicable in terms of macro, rather than micro structure. Morphological, rather than atomic structure may be the predominating factor in this rotation phenomena and Crick, in a personal communication to the present writer, has given it as his opinion that macro, and not micro structure is the explanation of Dr. Hirsch's results.

It would seem likely, from Hirsch's data, that the rotational movement of hair fibres which are under stress is much dependent upon the cystine disulphide bonds present in the keratin, since reduction of these disulphide bonds results in disappearance of the typical elongation-rotation type of curve (Fig. 9). The load-

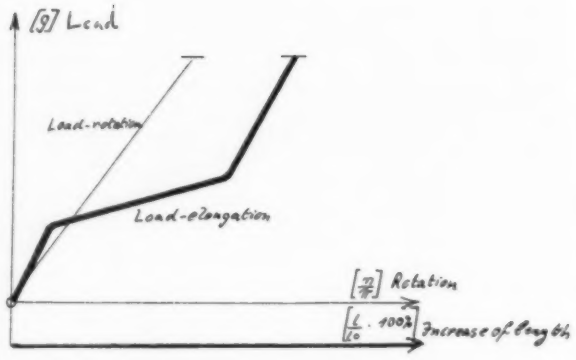


Figure 9

elongation curve for a particular fibre is, apparently, in synchronisation with Hirsch's load-rotation curve. Hirsch writes: "the synchronisation of elongation and rotary motion depends on the state of the cystine bridges, but the two motions are not based upon the same structural elements, since the load-elongation changes by breaking hydrogen bonds, while the load-rotation remains unaltered."

It is necessary to emphasize again, that the interesting and valuable research of Hirsch does not necessarily provide additional evidence for the spiral configuration of keratin. It may well be that the rotation-load curves arise as a consequence of macro structure, but, if this is, in fact, the case, then one would have to explain the undoubted part played in the case by the cystine bonds.

A more direct result of the work of Hirsch has been the possibility of correlating the load-rotation curves of particular hairs with the condition of the person from whom the hair originated. The actual health of a person determines, to a large extent, the type of load-rotation curve to be obtained on his (or her) hair. The future possibilities opened up by this line of research would appear to be most promising indeed.

To conclude this article, we may predict, with confidence, that the next few years will see the complete elucidation of the extremely difficult, yet highly intriguing problem of the structure of α-keratin.

REFERENCES

1. Astbury, "Fundamentals of Fibre Structure," Oxford 1933; see also J. Chem. Soc., (1942), 337; Advanc. Enzymol., 3. 63, (1943).
2. Astbury and Woods, Phil. Trans., A232, 333, (1934); see also Astbury and Street, Phil. Trans., A230, 75, (1931).
3. Springhall, "The Structural Chemistry of Proteins," Butterworths, London, 1954.
4. Corey, Advanc. Protein Chem., 4 385, (1948).
5. Astbury and Lomax, J. Chem. Soc., (1935), 846.
6. Pauling; Corey and Branson, Proc. Nat. Acad. Sci., Wash., 37, 205, (1951)
   see also Ibid., 235
   ibid., 241
   ibid., 251
   ibid., 256
   ibid., 261
   ibid., 272
   ibid., 37, 729, (1951)
   ibid., 38, 86, (1952)
   Nature, Lond., 168, 550, (1951)
   see also Pauling and Corey, J. Amer. Chem. Soc., 72, 5349, (1950); also Proc. Nat. Acad. Sci., Wash., 37, 282, (1951).
7. Bragg, Kendrew and Perutz, Proc. Royal Soc., A, 203, 321, (1950).
8. See reference no. 6.
9. Pauling, Corey and Branson, Proc. Nat. Acad. Sci., Wash., 37, 729, (1951).
10. Astbury and Street, Phil. Trans., A230, 75, (1931).
11. Pauling and Corey, Nature, Lond., 171, 59, (1953).
12. Crick, Nature 171, 59, (1952); see also Nature, 170, 882, (1952).
13. See Reference No. 11.
14. Huggins, Proc. Nat. Acad. Sci., 43, 204, (1957).
15. Huggins, "Physical Chemistry of High Polymers," Wiley, New York, 1958.
16. Hirsch, Kosm. Parf. Drog. Rdsch., Innsbruck, 7/8, 81, (1955);
    Beitrag z. Aufklarg. D. Keratinstruktur. Diss. TH., Munich, 1952;
    Seifen-Oele-Fette-Wachse, 143-144, (1955);
    D. Haar d. Menschen, Haug-Verlag, Ulm, Germany, 1956;
    Heilkunst 2, 1952);
    Angew. Chemie, Nov. 1955;
    Munch. Med. Wschr., 2105, (1951);
    ibid., 1175-76, (1953);
    J. Med. Kosmetik, 155-157, (1955).
17. Heilingoetter, American Perfumer, Nov. 1956; see also Kosmetik Parf. Drog. Rdsch., Innsbruck, 9/10, 121-122, (1956).

E. R. Durrer, Stephen Arctander and Maurice Couderchet

Xavier Serra, Pierre Coutin, Thomas Bialle and Camille Bourguet

Les Amis de Lange Francaise de la Parfumerie Meets

Raoul Pantaleoni, Dr. Oliver Marton, Albert Dillinger and Dr. A. T. Frascati

How flowers are cultivated in Grasse, France, for use in extracting essential oils and how the essential oils are made was graphically shown in color movies at the perennial meeting of Les Amis de Lange Francaise de la Parfumerie in the Essex House, New York City on the evening of January 29. The lectures were in French as usual and proved to be highly interesting and instructive. Pierre Bouillette acted as master of ceremonies with his usual tact and good humor. The illustrated lectures came after a sumptuous dinner served in the best French tradition and the occasion afforded the members an opportunity to chat informally about many subjects of timely interest. This selective gathering is unique. While it is attended principally by the leaders in the art of perfumery every member is given the opportunity to choose his subject which is expressed in an intimate and friendly conversational manner.

Continued on following page

Henry van Ameringen, Serge J. J. Lakhovsky and Henry Retalliau

Alphonse Pillet and Pierre Coutin

How Flowers Are Cultivated and How Essential Oil is Extracted Shown in Two Moving Pictures

Leon Gefen, Dr. Julius Safrin and Samuel Eskanazy

Pierre Weill, office of Commercial Counselor of France, Pierre T. Deleamont, Christian Wight, Jean W. Baer, and Fred Porter, Commercial Counselor to the French Embassy

Dr. Peter S. Heilperin, B. D'Ancona, Basil Pegushon and Maurice Meunier

Albert Stasse, Dr. Jean J. Martinat and Paul Lelong

exquisite

Pat. Pending

THESE loveliest and most elegantly proportioned of the Richford Spillproof Perfume Flacons* *now available in:*

FOUR FINISHES: Gold-Cote, Gold Mist, Gold Nugget and Clear

SIX SIZES: 1 dram, 2 dram, ½ ounce, 1 ounce, 2 ounce and 4 ounce.

Write now for samples and prices

*Trademark of the magic perfume containers that have launched millions of sales slip—their customer appeal and proved acceptance will help the sales of your product.

RICHFORD
CORPORATION

Office & Plant: 3618 Oceanside Rd., Oceanside, N. Y. Showrooms, 350 5th Ave., N. Y.

1.

2.

3.

YARDLEY—1

Yardley will introduce the first pressurized shaving lotion on the market around March 15. Jetstream After Shaving Lotion uses a nitrogen propellant and is packaged in a lightweight container, strikingly designed in white with product identification in black and red. The product will be launched in the consumer press with full-page advertisements in April issues of Reader's Digest and The New Yorker and with publicity in national magazines and newspapers.

HAZEL BISHOP, INC.—2

Hazel Bishop, Inc. is introducing a complete eye makeup line with one of the biggest TV campaigns and promotional backing ever given an eye cosmetic group. Roll-on or cream-type mascara, swivel-stick eye shadow and an eyebrow pencil-eye liner combination with built in sharpener make up the group. A specially designed "Pilfer Proof" display case, made to hold one dozen each of the new products, is available.

MARCEL ROCHAS—3

Marcel Rochas has introduced his first two American-packaged aerosols, Femme, a delicate feminine cologne, and Moustache, a popular masculine fragrance. Each is bottled in plastic-coated glass with a Risdon Micro-Mist valve and actuator. The two fragrances are available in a four-ounce size, at $6, and a seven-ounce size, at $9.

LENTHERIC—4

Lentheric's new counter display for Adam's Rib is another facet of the promotion that the company has inaugurated, tieing in the perfume with brides and bridal fashions. The promotion is under the banner of Allied Stores and was launched with a six-page advertising spread in the Spring issue of Bride's Magazine. The new Adam's Rib counter display, a graceful, leaf-entwined mobile, has a free-hanging bottle of Mist that balances other Adam's Rib items in their vivid packages of green, gold and white.

4.

5.

6.

7.

8.

MILLOT—5

F. Millot of Paris has developed three new floral spray colognes that will be available in retail stores throughout the United States from March 15 through May 1. The floral fragrances are gift packaged in spray cologne bottles, each in a gift-packaged box, decorated to represent its floral heritage.

MAX FACTOR—6

Max Factor is introducing a new Pink Jade Lipstick for Spring in an attractive counter display merchandiser. Prepack includes eight Hi-Society and Hi-Fi lipsticks in both Ebony and Tortoise cases, six lipstick refills, three Green Jade Eye Shadow Sticks and three Jet Gray Mascara Wands. April 5 is national advertising date.

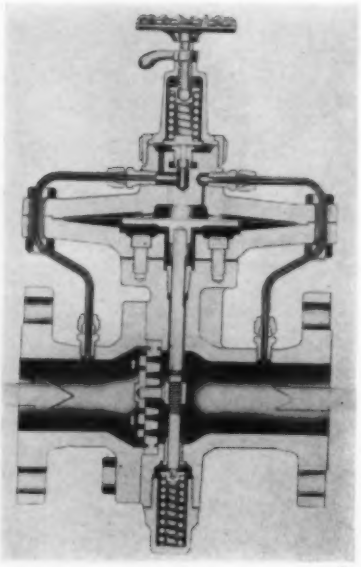
BOURJOIS—7

Bourjois announces the return of its popular Evening in Paris "Spring Special," especially priced at $1.00. Evening in Paris Cologne and Purse Perfume have been coupled in a unique presentation. The construction of the package emulates the base of the famed Eiffel Tower. A Parisian cart filled with flowers decorates the bottom of the package. Colors used are blue, white and cerise. With a perforated price tag, this "Special" is an inexpensive gift item.

HELENE PESSL—8

"Fifteen" is a gentle, roll-on lotion deodorant specially conceived and formulated for the needs of girls in the 10 to 15 year age brackets. It is reported to be gentle and protective for the most sensitive skins. Retail price is $1.00 plus tax.

New PRODUCTS & IDEAS



1.

BACK PRESSURE REGULATING VALVE—1

A new pilot operated Back Pressure Regulating Valve, incorporating OPW- Jordan's patented sliding Gate and Plate main valve, is now available. The valve features self-cleaning seats, integral pilot with filter screen, clog-resistant passages, and ball bearing adjusting screw with handwheel. Tight shut off is achieved with self-lapping seats. The 2-page Bulletin JNP-3 describes operation and contains illustrations, specifications, etc.

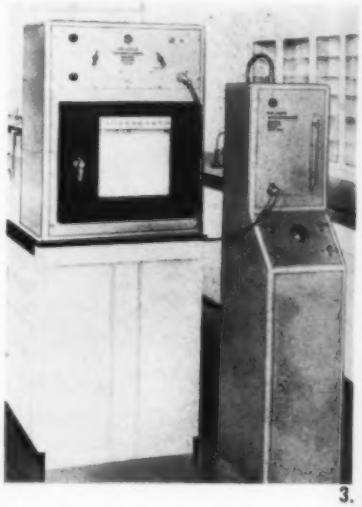
FILTER PRESS

A new Terriss Filter Press is now available to the processing industries for uninterrupted filtering operation. Filter cake will not fall away from plates during operation, the company reports. This unit is designed to operate in a vertical position and is equipped with worm gear for turning to a horizontal position for cleaning and loading. The filter plates are 18" x 18" with stainless steel filter media supports and screen backing plates. The machine is furnished with heavy duty ratchet sealing attachment, removable drip tray, and precision ground surfaces to prevent leakage.

PLASTIC COATED GLASS—2

A group of stock designs in various capacities is being offered by Owens-Illinois Glass Co. in connection with its recent introduction of improved plastic-coated glass pressure packages. The company is prepared to produce pressure packages within prescribed limits in a variety of shapes, sizes and a wide range of brilliant stock, as well as individual colors of plastic coating printed in one or two colors.

2.



3.

GAS-LIQUID CHROMATOGRAPH-3

A newly developed gas-liquid chromatograph is being produced by W. G. Pye & Co., Ltd., of Great Britain and marketed in North America by Jarrel-Ash Co. The Pye Argon Chromatograph employs an ionization detector system which enables it to detect as little as 2×10^{-11} moles of most organic substances. In contrast with conventional chromatogrpahs employing thermal techniques, the Pye Argon Chromatograph's ionization detector system maintains stability and reproducibility virtually independent of such variables as temperature, pressure, or flow rate. Since the instrument readily accepts samples as small as 0.025 microliter, column overloading is prevented and efficiencies of over 1000 theoretical plates per column foot are obtained.

ALUMINUM BOTTLES

The American Aluminum Co. is offering standard stock seamless aluminum bottles from one-eighth ounce to 768 ounce capacities, available with threaded or cork openings, with caustic etch finish. The finish is commercial caustic etch.

Replica of perfume bottle used in the year 1768

SINCE 1768 the House of Chiris has dedicated itself to the Fifth Sense. In the development of Essential Oils, Floral Absolutes, Chemical Isolates, Synthetic Chemicals, and all those creations and specialties which combine industrial aromatics with natural products and produce fragrance, the House of Chiris has a cherished history. Today Chiris maintains laboratories headed by experienced chemists who have available to them not only the accumulated knowledge of generations of Chiris perfumers and chemists, but also the research facilities of five modern laboratories located in Grasse and Paris, London, Sao Paulo (Brazil), and New York City. Whether Essential Oils, Isolates, or combinations thereof, are used as fragrance constituents by the perfumery, soap, cosmetics or allied industries, we are happy to be consulted.

ANTOINE CHIRIS CO., INC.

220 East 23 Street, New York 10, N. Y.

GRASSE · PARIS · LONDON · SAO PAULO

Why..."Encyclopedia of cosmetic material trade names"?

First, let it be known that the title, as lengthy and wordy as it is, does not begin to describe the full content and function of this great reference work by the eminent deNavarre.

To be sure, it presents a comprehensive, never-before published, **international** listing of more than 3000 cosmetic material trade names.

Of equal if not greater importance, the Encyclopedia serves to identify the composition of the particular materials and in many instances also lists specific types of cosmetic items in which they are used... plus a complete, cross-indexed classification of the various types of materials... plus the complete name and address of the supplier of each material.

Over ten years ago deNavarre saw a real need for such a technical reference book as this. That is why and when he started to compile the necessary material from all over the world. In the interim years, as the number of trade name materials grew, as new sources entered the field, the need for this type of reference volume grew apace. And over these years deNavarre religiously devoted time, effort and care in building, editing, refining and **organizing** his expanding storehouse of material.

Obviously, this Encyclopedia, because of its definitive content and function, because of its finger-tip reference and cross-reference features, because it does represent the answer to a long felt growing need, will serve its highly selective subscribers not only well but over and over again for years and years to come.

426 pages, 6" x 9", clothbound, shipped postpaid anywhere in the world at **$7.50 per copy.** To order copies, write Book Division, **American Perfumer & Aromatics, 48 West 38th Street, New York 18, New York, U. S. A.**

Technical Abstracts

TOXICITY OF "TALC". There are many different forms of talc (soapstone or steatite), which basically is a hydrous magnesium silicate. This compound per se is not fibrogenic, but most commercial preparations of talc contain varying amounts of tremolite, which is a fibrous magnesium silicate. Lung fibrosis resembling asbestosis can result from heavy and prolonged exposures to such fibrous compounds, including typical asbestos bodies in the microscopic sections. Also, some talc preparations may have quartz impurities, which might result in a lung fibrosis resembling silicosis after heavy and prolonged exposures. Specimens of the talc under suspicious ought to be given careful minerological studies before too definite conclusions are drawn. Thru *J.A.M.A.*, June 28, 1958, 1192.

STUDIES OF THE MECHANISM OF ALLERGIC ECZEMATOUS CONTACT DERMATITIS. 1. FINDINGS ON HUMAN SKIN WITH RADIOACTIVE BICHLORIDE OF MERCURY. Written, V. H., Grayson, L. D., and Birnbaum, V. H.; J. Invest. Dermat. *28*, 339 (1957). The Pathogenesis of allergic eczematous contact dermatitis in man was studied by the use of radioactive bichloride of mercury ($HgCl_2$) in which the mercury was the tagged allergen. Uniform patch tests with a 1:1,000 dilution of a 0.5 per cent aqueous solution of $HgCl_2$ were carried out in normal persons and in individuals with known eczematous allergic sensitivity to this compound. The solution of radioactive bichloride of mercury was applied to selected areas on the lower back. The patches were removed after 48 hours and the sites excised. The biopsy specimens were prepared by one or more specific methods. In each instance, the cut tissue sections were placed on nuclear track plates for 10 to 21 days to produce autoradiograms which could be read under the microscope.

No difference in the routes of penetration, sites of deposition, and localization of radioactively labeled allergen were shown in the skins of known specifically allergic or nonallergic persons. In both groups of subjects, autoradiograms regularly demonstrated the radioactive mercury to be on the surface and within the epidermis, usually in the hair follicles and occasionally in sweat ducts. There was no evidence of the spread of radioactivity even one inch away from the patch test site. The authors pointed out that there may be quantitative differences in the radioactive mercury deposits in the allergic as compared to the nonallergic subjects, but the technique employed in these experiments would not permit such a fine differentiation. Thru J. Allergy, *29*, No. 1, 5 (1958).

IRRITATION OF SKIN FROM METALS.

To The Editor:—What is the condition in which a person's skin or perspiration causes various metals to tarnish and irritate that skin? What is the underlying pathophysiology and how may it be cured? What is the chemical component of perspiration which causes tarnishment of jewelry and/or skin reaction to metal? Byron W. Kilgore, M.D., Indianapolis.

Answer.—There is no known entity that causes metals to tarnish and irritate the skin. Irritation from metals (redness, swelling and itching) may result from trauma (friction) or from sensitivity, especially to nickel in various alloys. The tarnishing of the metal arises from the moisture and the sulfur in the perspiration, which is in the form of sulfhydryl groups. This tendency is increased by hyperhydrosis. Thru *J.A.M.A.*, Feb. 1, 1958,

THE SYNTHESIS AND AEROSOL FORMULATION OF CERTAIN RARE EARTH COMPOUNDS AS POTENTIAL ANTIPERSPIRANTS, by Roger Mantsavinis and John E. Christian. J. Am. Pharm. Assn., *47*, 29 (1958).—Neodynium methionate, praseodymium methionate, samarium methionate, and praseodymium sulfamate have been prepared and characterized. Two new potential antiperspirant mixtures, a mixed rare earth methionate and a mixed rare earth sulfamate, have been synthesized and analyzed. Aerosol formulas of a mixed rare earth methionate and a mixed rare earth sulfamate have been developed and studied for such properties as stability and solubility at various temperatures, vapor pressure, and corrosion.

INVESTIGATION OF HUMAN SKIN LIPIDS I by James E. Tingstad, Dale E. Wurster and Takeru Higuchi (School of Pharmacy, Univ. of Wisconsin, Madison). A method of harvesting relatively large quantities of skin lipids from human volunteers is presented. Experimental evidence indicates that the collected lipids are composed mainly of those produced by the sebaceous glands and that the lipids obtained from the arm and back regions of the body are similiar in chemical composition. No significant chemical decomposition of the skin lipids was detected when the material was stored at low temperatures. The chemical species which are responsible for observed seasonal variations in the composition of human skin lipids have been determined. . . . Fatty carboxylic acids and esters of those acids, which absorb in the 5.85 and 5.75 micron regions, respectively, of the infrared spectrum, are deemed responsible for the observed seasonal variations in human skin lipid composition. J. Am. Pharm. Assoc., Sci. Ed., *48*, 187-191 (1958).

NYLON BRUSHES AND HAIRFALL. "Nylon hairbrushes were found to be the cause of some puzzling cases of hairfall by Agnes Savill (British Journal of Dermatology, Aug.-Sept., 1958, *70*, 296). A typical case was that of a young man aged 27 who, apart from the usual retreating hairline on both temples, had 'a large, almost bald region of a triangular shape on the right side of the vertex' which had steadily enlarged during the past year. Microscopical examination revealed a condition which resembled tricorrhexis nodosa. Treatment with oil and massage was instituted but there was no sign of regrowth of hair. Upon inquiry it was found that the patient had been using a nylon hairbrush for over a year and had applied it with special vigour along the right side of the vertex. He was instructed to get a bristle brush at once, and three months later the area 'was covered with strong hair of normal length and appearance.' Investigation revealed that in many patients using nylon hairbrushes the hairs were not broken but had been pulled out with the roots. Tests were carried out with the various types of nylon bristle used for hairbrushes, and only one type, which when examined under a magnifying glass was found to have rounded points like the head of a match, was safe to use." THE PRACTITIONER, *181*, 664 (1958).

CITROPAL® contains the identical proportions of only those components which we found to be in terpene- and sesquiterpeneless natural lemon oil.

CITROPAL® combines the full pure odor and flavor with the stability, uniformity, availability, economy and other advantages of synthetic products.

CITROPAL® is particularly recommended:

a) In compounds for Perfumes and Colognes, all Lotions, Cosmetic Products, Soaps and Detergents.

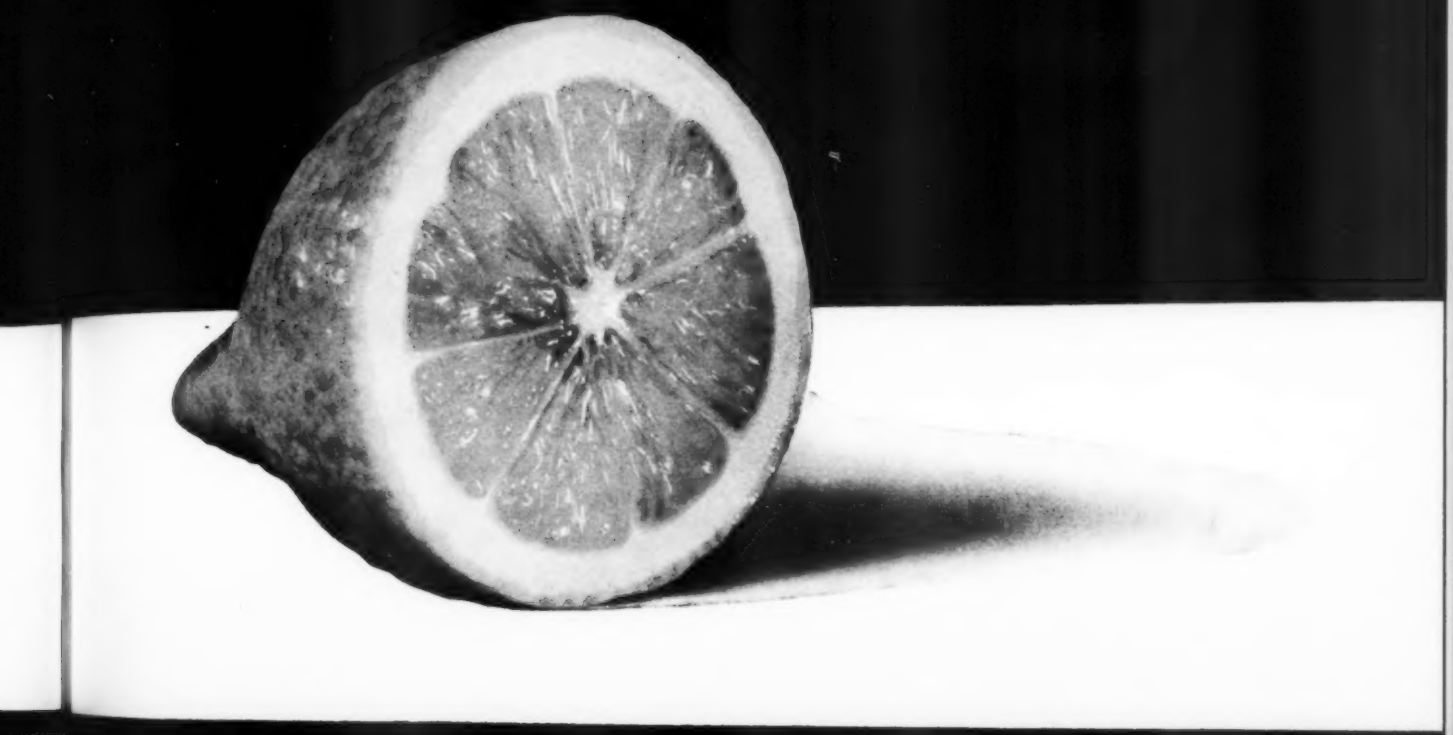
b) In the manufacture of lemon-flavors.

DRAGOCO INC.

250 West Broadway, NEW YORK 13, N.Y.
Tel. Canal 6 - 58 13/15

CITROPAL®

A PERFECT REPRODUCTION OF TERPENELESS LEMON OIL



Note further details and suggestions from our data sheet.

Technical Abstracts

(continued from page 59)

CONTRIBUTION TO THE PROBLEM OF POSSIBLE SKIN IRRITATIONS BY LIPSTICKS

The present investigations show that the living human skin of the lip is not stained uniformly by the so-called "kiss proof" lipstick.

Only certain regions of the skin surface are stained. Essentially, the lipstick mass which has just been applied covers the high spots of the skin. After wiping the lipstick mass off, the high spots are relatively free of lipstick mass and the remaining mass now lodges in the furrows and cracks of the lips.

In spite of continued use the skin of the lips cannot be stained uniformly. To the naked eye, the uniformity of the stain is only apparent because the human eye is unable to dissolve optically the discontinuity of the film raster of the stain.

The penetration of the stain into the skin according to the present observation amounts to only two-fifths of the thickness of the stratum corneum. Therefore, it does not even come close to the so-called living regions of the epidermis. *Abstract of T.G.A. paper by Otto K. Jacobi, Ph.D.*

THE EFFECTS OF AEROSOL HAIR SPRAYS ON EXPERIMENTAL ANIMALS

An investigation was undertaken to evaluate the effect in experimental animals of exposure to aerosol hair spray formulations. Two complete and commercially available hair spray formulations were investigated along with two incomplete "treated control" formulations, one containing polyvinylpyrrolidone, alcohol vehicle and propellant, and the other vehicle and propellant alone. The investigation involved subjecting the animals to thrice daily exposure to these hair spray formulations for a period of from 45 to 90 days.

No evidence was accumulated which could be interpreted as indicating any significant differences between effects on animals exposed to the two test hair sprays and the two "treated controls."

Even under the rather drastic test conditions employed, the materials involved appear to be innocuous. *Abstract of T.G.A. paper by Dr. Joseph Calandra and Dr. John H. Kay.*

CONVERTING LABORATORY CONCEPTS TO THE CONSUMER MARKET

If we expect to convert product concepts into profit, we must consider the changing consumer needs and desires in every phase of the product development and testing program.

The three common approaches used to evaluate product change and new product introduction are the use of the "expert" approach, the employee panel and the laboratory approach. The expert approach uses one or a few persons, a typical of the consuming public, who through testing and judgment make all the final decisions as to product changes or new product introduction. These principles of expert testing were originally adapted from the field of quality control where as a measurement of consistency of quality it is a good workable device. However, when small numbers of 5 or 10 experts try to interpret the differences, likes or dislikes which may or may not be apparent to the consumer, we are treading on dangerous grounds.

The second approach in testing new product concepts uses small groups of untrained company personnel. These groups are usually inadequate in size and lack adequate controls. No order or scientific techniques are used. Employees are simply brought together in an unorganized manner and generally asked their opinions as a group.

The third approach is called the "laboratory approach" where panels of adequate size and representativeness are tested so that sufficient, reliable and scientific data can be ascertained. The laboratory tests although sound in concept, too often, are conducted among employees of the company where conditions of usage may be biased by dislike of the job, the supervisor or by the duty bound employee who feels it his unconscious duty to praise the company products.

Along with the representativeness that is inherent in using consumers, if all the costs of employee tests were computed, it would probably equal or exceed the cost of going directly to the consumer. So let the consumer be the judge as he will eventually be in the market place.

The prime purpose of laboratory tests are to determine whether or not there is a difference in the test product apparent to the ultimate user after one exposure. They, therefore, should be conducted among a group typical of the consumer, not by a biased group of employees or a vice-president, or an individual with extra sensitive characteristics.

There is also a need for extended use tests—which is a distinctly different phase of the over-all product development and testing program. The extended use test considers the product characteristic analysis developed through laboratory technique as an integral part of the over-all product and does not over-emphasize the importance of the existing change. Furthermore, the use test permits the consumer to prepare and use the product many times under the same conditions as it would normally be used, if purchased.

If your product has been developed and tested through each of the testing stages with the consumer in mind, the chances are, that this product testing cycle, has developed a product which can gain consumer acceptance in the market place. *Abstract of T.G.A. paper by Robert E. Spinner.*

ANTIPERSPIRANT TESTING: A COMPARISON OF TWO METHODS

The back test method is a more rapid and convenient procedure for measuring antiperspirant efficacy than the axillary method and gives the same range of average results with equal accuracy. An exception to this conclusion which must be cited involves certain cream-type products which apparently form a surface coating on the skin, resulting in large reductions of perspiration on the back which cannot be duplicated in the axilla. Neither the back test method nor the gravimetric method used in the axilla gives very good precision with small panels, but the precision is about the same in each method, and there appears to be no other procedure which is more reliable. The major reason for the lack of precision appears to be the variation in response of individuals to given antiperspirant materials; it is necessary, therefore, to use fairly sizable panels in order to gain a realistic idea of the average effectiveness of a product. The saving in time and the greater flexibility of experimental design possible with the back method make it an interesting and useful alternative to underarm testing. It is particularly suited to screening materials for antiperspirant effect. *Abstract of T.G.A. paper by E. W. Daley.*

RESEARCH OF DEPTH AND IMAGINATION

Constant research for more than 65 years has made the contribution of Firmenich to the perfumery world both substantial and imaginative. Joining the academic approach to technical skills, Firmenich has achieved the synthesis of a wide range of natural materials, created new tonalities, discovered complex notes hitherto unperceived. These specialties enjoy universal acceptance and their creators have been honored by the Nobel Prize and four International Awards administered by the American Chemical Society. The originality of their research has been shared with fellow scientists in more than 300 technical papers. Firmenich technicians are highly qualified to assist you in your creative problems and in the use of Firmenich specialties in your imaginative practice of the art of perfumery.

FIRMENICH INCORPORATED

FIRMENICH & CIE
SUCCESSEURS DE
CHUIT NAEF & CIE
GENEVE SUISSE

250 WEST 18TH STREET, NEW YORK 11
FIRMENICH OF CANADA, LIMITED,
348 WALLACE AVENUE, TORONTO
CHICAGO OFFICE: 612 NORTH MICHIGAN AVENUE
LOS ANGELES, 1756 MALCOLM AVENUE
GENEVA PARIS LONDON

News and Events

Dr. Ernest Guenther On South American Survey

Dr. Ernest Guenther, vice president and technical director of Fritzsche Brothers, Inc., flew to Santiago, Chile recently on the first leg of scheduled three months' survey of South and Central American essential oils.

From Chile, Dr. Guenther will fly to Argentina, visiting the New York essential oil firm's Latin American affiliate in Buenos Aires, thence investigating the latest production of peppermint, spearmint, Mentha arvensis, lemongrass and citronella. An extensive trip to Brazil will take in that country's production of Mentha arvensis, as well as sassafras, eucalyptus, ventiver, peppermint, etc. A trip up the Amazon to the interior will take Dr. Guenther to the bois de rose distilleries near Manaus. From there a flight to Peru will permit a further study of bois de rose production in the interior of this picturesque region. His itinerary next includes Bolivia, Guatemala and Mexico, with investigations enroute of lime oil, lemongrass, citronella and cardamon.

A complete pictorial record will be made throughout the trip and Fritzsche Brothers, Inc., sponsors of his investigations, will issue—as received—their colorful and informative GUENTHER REPORTS covering the entire course of his journey and experiences.

Colgate-Palmolive Completes Wildroot Co. Purchase

The Colgate-Palmolive Co. has announced that it has completed negotiations for the purchase of the Wildroot Co. The formal signing took place in Buffalo on February 25. Marketing of Wildroot products will be taken over by the Toilet Articles Division of Colgate-Palmolive Co. on April 1.

C. Guy Grace was elected president of Wildroot. He is vice-president and general manager of Colgate-Palmolive Co.'s Toilet Articles Division.

Other new officers of Wildroot are: Robert E. Hilbrant, vice president and Hugh Jewett, vice president and secretary. Both are Colgate vice presidents and Mr. Jewett is also secretary of Colgate-Palmolive Co. Edward J. Pempsell was elected treasurer. Robert E. Schwartz will continue as general manager of Wildroot in Buffalo.

Junior Achievers Build Good Will in Puerto Rico

William M. Bristol III, president of the Bristol-Myers Products div. of the Bristol-Myers Co., Hillside, N. J. was host at a reception to 28 young people selected from 13 public and parochial high schools as junior achievers at a reception in New York February 5. The young people, all between the ages of 15 and 17, as guests of 28 leading corporations in New Jersey flew to Puerto Rico February 9 for a four day trip as ambassadors of good will.

While in Puerto Rico they met the governor and other public officials, industrialists and business men and each lived in the home of one or the other during the trip. The purpose of the trip called "Operation Puerto" was to expand the "learn by doing" principle and to broaden the thinking of the young people and to demonstrate how essential are full understanding, team work and cooperation to the continued strength and growth of both the Commonwealth of Puerto Rico and the United States. Junior Achievement is a national public relations program of business and industry.

Naarden Creates Symbolic Perfume

As a tribute to international cooperation and to mark the occasion of the visit of Prof. Dr. Walter Hallstein, chairman of the Commission of the European Economic Co-operation, "Naarden" created a symbolic perfume of plants and flowers characteristic of some forty different countries in all parts of the world. "Royal Leerdam," internationally famous for its beautiful crystal, designed a special flacon

for the perfume. The creation was accompanied by a hand-made, leather-bound book describing the birth of scent and crystal as a symbol of Holland's task with respect to international co-operation. This perfume was presented to H.M. Queen Julianna; the wife of the Dutch Foreign Minister, and wives of diplomatic representatives from 20 other countries.

SHULTON SENDS DALI PAINTINGS ON TOUR

Salvador Dali, world renowned artist and master showman, meets with Frederic Rowe and James McNamara of Shulton's International Division, as three of his paintings, said to be valued at approximately $100,000 go through customs at Idlewild Airport. The paintings comprise a trio commissioned by Shulton to interpret their Desert Flower perfume, and will be shown in seven Latin American cities to introduce Shulton's Desert Flower Beauty Ice.

OREGON ESSENTIAL OIL GROWERS MEET

Officers and directors of the Oregon Essential Oil Growers League which concluded annual meeting at Oregon State College, January 9, are (seated, l. to r.) Iain MacSwan, OSC plant pathologist, secretary; Dale Eisenmann, vice president; Dan Fry, Jr., president; and Vernon Woods, re-elected treasurer. New directors (standing, l. to r.) are Norb Mueller, re-elected; James Gossler, Robert Richardson, and hold-over directors Paul Jasa, Leon Funke, outgoing president, and Dale Turnidge.

Seventeen, Weil Perfumes Co-sponsor Perfume Offer

Seventeen Magazine and Weil Perfumes will tie-in on a joint promotion in April to introduce Weil's Antilope perfume to the under twenty market. The magazine offers readers a purse-size bottle of Antilope on a write-in basis for the handling cost of 50¢ The offer is made both in a four-color, two page spread, and through a special coupon. The sample bottle contains one-sixteenth of an ounce of the French perfume.

MM&R Sales Conference Stresses New Products

Many important new products, developed by Magnus, Mabee & Reynard, Inc., New York essential oil firm, were presented at the company's 1959 Sales and Technical Conference held in New York City from Feb. 12 to 14, and attended by sales representatives from all parts of the United States and from overseas. Special symposia were devoted to the applications of MM&R products in the aerosol, cosmetic, and other industries.

WHOLESALE DRUGGISTS MEET IN LOS ANGELES

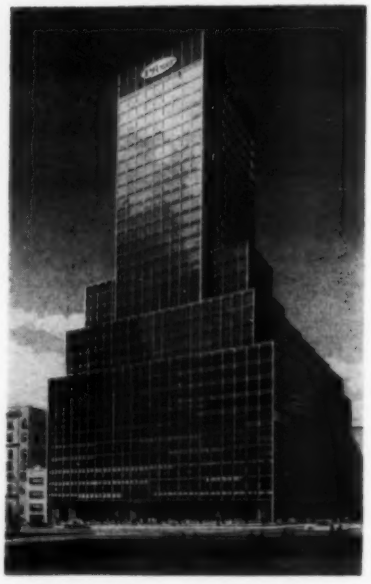
At the annual mid-winter meeting of the NWDA Executive Committee held at the Biltmore Hotel in Los Angeles, NWDA President H. C. Van Arsdale is shown presenting NARD Executive Secretary John W. Dargavel with a plaque naming him an Honorary Member of NWDA as other NWDA officers look on. (L to R) Van Arsdale; Harry A. Kimbriel, Exec. V.P.; Dargavel; W. W. Walker, 2nd V.P.; Henry Henley, 1st V.P.; and Roy V. Schwab, Chairman of the Board.

Pfizer Building to be Constructed on 42nd Street

The major part of a 32-story office building to be constructed at 235 East Forty-Second Street has been leased by Chas. Pfizer & Co., Inc., according to a recent announcement by J. William Stuart, Pfizer vice president. The structure, to be known as The Pfizer Building, will serve as world headquarters for the 110 year old chemical and pharmaceutical firm and its subsidiary companies.

The new structure will contain 525,000 square feet of floor space, the major portion of which will be designed to Pfizer specifications. Fully air conditioned, the building will feature a glass and aluminum facade, an underfloor electrical duct system, high-speed automatic elevators and other elements of modern construction.

Situated one block west of United Nations Headquarters, the new building will house employees of the company's international division and domestic sales and service departments now at 800 Second Avenue. In addition, sales, accounting and financial functions now located in Brooklyn will move to the new address when the offices are ready for occupancy in the Spring of 1961.



Pfizer's space in the building will be leased on a long term basis from its owners, the 235 East Forty-second Street Associates headed by Harry B. Helmsley. Emery Roth & Sons is the architect for the building which will be erected by the Diesel Construction Co. Pfizer's Engineering Dept. developed the company's specifications and Leonard-Colangelo is serving as design consultant for the Pfizer offices.

The establishment of a Pfizer world headquarters in one building stems from the company's growth and diversification in this country and abroad and provides a central location convenient to Pfizer operations in the New York Metropolitan area. These include the company's plant in Brooklyn, sales offices in Clifton, N. J., and research laboratories in Maywood, N. J.

Breck Advertising Receives Six Local Awards

John H. Breck, Inc. recently won six separate awards for advertising and point-of-sales material entered in the Seventh Annual Merit Awards Competition conducted by the Advertising Club of Springfield (Mass.). The firm received 1st prize in the category of "Integrated Campaigns" with an entry including samples of its TV commercials, magazine ads, trade ads, newspaper ads, bus cards and catalog sheets.

Creative Thinking Urged by Perfumers Speakers

Creative thinking was the theme of an interesting lecture before the members of the American Society of Perfumers at the February 18 meeting. Dr. Raymond C. Baker, a teacher and lecturer for 35 years explained the psychological background of human beings in which 95% of all thought is influenced by the subconscious mind and then explained the nature of creative thinking and how it may be employed. The lecturer proved to be an interesting and effective speaker.

The meeting was presided over by Dr. Oliver Marton, president; and Dr. Hilary Herchelroth, program chairman introduced the speaker.

Vogue Magazine Beauty Book Slated for September

Vogue magazine will publish its third annual Beauty Book this September. The guide to beauty news has been a sell-out for the past two years. The edition this year is being increased to 230,000.

40% of the edition will be sold through drug stores, 30% in supermarkets and the rest in department stores, beauty salons, terminals, newsstands and stationery stores. While this parallels current magazine distribution practice, it also is in line with the distribution pattern of many of its advertisers.

Collapsible Metal Tube Volume Shows Upturn

With December shipments of collapsible metal tubes up 5,690,000 units, compared with December a year ago, a gain of 6.5%, the Collapsible Tube Manufacturers' Council recently reported another billion-unit year for 1958, the fourth in its 118-year history.

Saturated Sponge in Flexible Film Package

The Ivers-Lee Co. of Newark has developed a method for sealing a fully saturated sponge inside an individual flexible film package. The sponge retains any liquids in a moist state, according to the firm, and can be produced in single units or strips. The sponges can be packaged in either foil or transparent films, and either packaging can be imprinted with directions and advertising message.

NEW YORK SCC NAMES COMMITTEE CHAIRMEN

Newly appointed Committee Chairmen of the New York Chapter of the Society of Cosmetic Chemists: (seated, from left to right) Irving Klapp, Publicity; Harry Isacoff, Ex-Officio; Nicholas Accousti, By-Laws; Irving Colbert, Membership. (Standing, from left to right) Herbert Edelstein, Interprofessional Relations; Jean Baer, Hospitality; Robert Schiraldi, Education; Arthur Cohane, Program; George Kackajian, Entertainment; Martin Reiger, Interprofessional Relations. Missing from Photo: Robert Warfield, House.

Johnson & Johnson Acquires McNeil Laboratories

Johnson & Johnson, New Brunswick, N. J. has acquired McNeil Laboratories, Philadelphia, Pa. There will be no change in the corporate name or management of McNeil Laboratories.

Andrew Lynn to be President of Prince Matchabelli

Andrew A. Lynn, vice president of Chesbrough-Pond's Inc. will assume the additional duties of president of Prince Matchabelli Inc., the subsidiary acquired last Autumn, on April 1.

T. S. BELL RETIRES AFTER 19 YEARS

A dinner was given in honor of T. S. Bell during the recent Bonne Bell Sales Meeting. T. S. Bell, youngest brother of J. G. Bell, founder and president, is retiring after nineteen years of service with the company as treasurer. He was presented at the dinner with a sterling silver five-piece coffee service suitably inscribed. Shown in the picture are T. S. Bell with his arm around Bonne; just behind him, Jesse Bell, executive vice-president; and next to him, J. G. Bell. Seated is Mrs. J. G. Bell.

McKESSON EXEC RECEIVES MERCHANDISING AWARD

Charles R. Beall, vice-president of McKesson and Robbins Inc., was presented with The New York Merchandising Executive Club Award in recognition of McKesson's outstanding "1958 Merry Christmas Drug Store" promotion. In presenting the award, Victor Pietrowski, left, described the McKesson promotion as a "pace setter embodying all the elements of good marketing with benefits for manufacturer, wholesaler, retailer and consumer."

Pfizer Family Products Names Marketing Manager

Robert F. Geissler has been named products marketing manager for the new Family Products Department of Chas. Pfizer & Co., Inc.

Mr. Geissler is now coordinating the development of Pfizer non-prescription products for marketing through the nation's pharmacies. Until the formation of the new proprietary department in mid-1958, the company sold only two proprietaries. Since then, six new Pfizer Family Products has been added.

Mr. Geissler is a graduate of Western Massachusetts College of Pharmacy, and is licensed to practice in Massachusetts. He joined Pfizer Laboratories as a professional service representative in 1953. In 1955, Mr. Geissler was appointed to Pfizer's government sales department and later served as assistant antibiotic product manager.

General Electric Announces Silicone Products Appointment

Jerome T. Coe has been named general manager of General Electric Co.'s Silicone Products Dept. at Waterford, N. Y. Mr. Coe succeeds Dr. Charles E. Reed who becomes general manager of the Metallurgical Products Dept. Both Dr. Reed and Mr. Coe have been associated with G-E silicone operations since 1942 and have made many contributions to General Electric's technical and commercial progress in the silicone field. Most recently serving as manager of marketing for the Silicone Products Dept., Mr. Coe has been, successively, manager of process development, manager of manufacturing engineering, customer service supervisor, sales development manager and sales manager. He joined General Electric in 1942 after graduation from Massachusetts Institute of Technology.

Warner-Lambert Announces Family Products Appointment

The appointment of John J. McClellan to vice president and general manager of Oral Products in the Family Products Division of Warner-Lambert has been announced by John S. Hewitt, president of the Division. Mr. McClellan was formerly general manager of Oral Products. He has been associated with Warner-Lambert since 1947, having been previously field sales manager of the Lambert Pharmacal Division of Warner-Lambert.

TV AWARD TO MAX FACTOR—Screen star Ida Lupino, on behalf of Harry Ackerman, president of the Academy of Television Arts and Sciences, presents the Academy's Distinguished Service Medallion to Max Factor, Hollywood's noted beauty authority, for his invaluable services to the television industry in the field of make-up for both black-and-white and color TV.

Knox Glass Board Chairman Resigns

Victor T. Norton, chairman of the board of Knox Glass, Inc., the nation's fourth largest manufacturer of glass containers, recently resigned from his position as chairman and as a director of the company. His resignation was made

known at the annual shareholders meeting. At the director's meeting which followed, it was decided to leave the position of board chairman vacant for at least the next year. Elected to fill Mr. Norton's position as director was William B. La Venture, member of the New York law firm of Reynolds, Richard, Ely and La Venture, which serves Knox as corporate counsel. In the above photo, Victor T. Norton, left, shows a shotgun, presented to him by the board of directors, to Dr. Arthur W. Wishart, president of Knox Glass.

HELENA RUBINSTEIN HONORED BY ISRAEL

Prime Minister David Ben-Gurion is shown with Helena Rubinstein during special ceremonies dedicating the Rubinstein pavilion at the Tel Aviv Cultural Center. She donated half the cost of the $250,000 building and said it was offered "as a showcase for the works of artists of Israel and as an everlasting tribute to its people."

National Bureau of Standards Finds Efficient Ozone Conversion

A laboratory method for the efficient conversion of oxygen to ozone has resulted from National Bureau of Standards studies on trapped radicals, sponsored by the Department of Defense. The process, which gives nearly 100 per cent conversion under certain operating conditions, involves the electrical dissociation of oxygen in a microwave discharge near a surface cooled with liquid nitrogen. Not only is this a convenient method for producing ozone for laboratory use, but the possibility of commercially producing ozone in this way suggests that the expense which has to date limited its use can be considerably reduced.

January Paper Box Shipments Decline

January shipments of folding paper boxes were off 3.6% in dollar volume and 5.3% in tonnage from the same month last year, according to a recent announcement.

OBITUARY

Dr. Paul Muhlethaler

Dr. Paul Muhlethaler, president of Tombarel Products, died February 6, at Short Hills, N. J. He was a member of the Society of Cosmetic Chemists, the French Chamber of Commerce in the U. S. A., and the Society of French Perfumers.

SPOTLIGHT News...

Radioisotopes Discussed at Cosmetic Meeting. Dr. M. F. Nelson, of the Radiotracer Laboratory at the Atlas Powder Co., addressed the New York Chapter of the Society of Cosmetic Chemists on March 4, at the Hotel New Yorker. Dr. Nelson gave a paper entitled: "A Review of the Uses of Radioisotopes in Detergent and Cosmetic Chemistry." He discussed how radioisotopes have been used in skin studies; in oral cavity research; in human hair studies; in methods developed for detergent evaluation; in astringents; and in the metabolic fate of formulation additives in order to facilitate clearance of the materials of the Food & Drug Administration.

LP-Gas Finds Use as Aerosol Propellant. A new application has been found for liquefied petroleum gases as aerosol propellants. Used in the aerosol packaging fields LP-Gases are known as hydrocarbon propellants. Both butane and propane are being used for function which have been limited until recently to nitrogen, carbon dioxide, and Freon. Peterson Filling and Packaging Co. of Danville, Ill., has recently installed a battery of LP-Gas tanks which are manifolded and piped to allow them to select and dispense propellant for any packaging run with a minimum of effort.

Two-Week Residence Course in Perfumery and Essential Oils. During July, 1959, Rutgers University, the State University of N. J., will conduct a two-week residence course in Perfumery and Essential Oils at the New Brunswick campus. The course consists of lectures and laboratory sessions. The cost of the course will be approximately $200.00 This will include tuition, dormitory lodging, laboratory and notebook materials. The instructor will be Mr. Steffen Arctander of Colgate-Palmolive Co., Jersey City.

Ladies' Night Planned by New York Cosmetic Chemists. The New York Chapter of the SCC is planning a ladies' night dinner for their April 1 meeting at the Hotel New Yorker.

Colgate-Palmolive Co. Plans 3-for-1 Split, Boost in Dividend. Shareholders of Colgate-Palmolive Co. will be asked on April 22 to vote on a stock split proposal. Should the stock be split, outstanding common shares would be increased to about 8 million from 2½ million. In announcing the company's intention, it was reported that the company's consolidated earnings for 1958 were a record $8.27 a share, up from $7.81 a share, earned in 1957.

Two Chemists Win Top Glycerine Research Award. Drs. Leo A. Goldblatt and Robert S. McKinney of the Southern Utilization Research and Development Division of the U. S. Department of Agriculture were recently honored with the top 1958 Glycerine Research Award by the Glycerine Producers' Association, for outstanding achievement contributing to knowledge and use of glycerine and its derivatives. Drs. Goldblatt and McKinney synthesized and examined the unique physical properties of tung oil monoglycerides.

Aerosol Fragrances Announced. A new series of fragrances was recently announced by Givaudan-Delawanna, Inc. These fragrances are the result of a research program on incense odors conducted by the aerosol and perfume laboratories of the company. They are being marketed to fulfiill a current need for the enhancement of the atmosphere in homes and to create odor moods similar in nature to "mood music".

American Cholesterol Products Inc., has announced the renewal of their research grant to the Philadelphia College of Pharmacy and Science. This grant provides for basic and applied research in the field of lanolin fractions and derivatives and their function as emollients.

Procter & Gamble Six Months Net Rises. It has been reported by a P&G company spokesman that the consolidated net earning of the last six months of 1958 totaled $43,116,942. These earnings are equal to $2.09 per share on the average number of common shares outstanding in that period.

Purchase of VCA Laboratories, a subsidiary of the Rexall Drug Co., by Lanolin Plus, Inc. of Chicago, was announced during the past month by Justin Dart and Morton Edell, presidents respectively of Rexall and Lanolin Plus, Inc.

Penick Forms Product Development Department. S. B. Penick & Co. has announced the establishment of a product development department. The primary objective of the new department will be to develop new products in areas encompassed by fermentation products, plant derivatives, synthetic organic chemicals, and farm chemicals. A second objective will be the development of new uses for existing products. The department will be devoted exclusively to the initial bulk marketing and development of these materials.

VCA Makes Ten Percent Cut in Metered Valve component prices. The decrease in prices of metered valves, "Mist-Top" actuators and stainless steel inner containers, effective immediately, was made from a reliable source within the firm's management.

PERSONALITIES

C. W. Gerberding, chairman of the board of Dragoco, Holzminden, parent firm of Dragoco, Inc., will celebrate his

C. W. Gerberding

65th birthday on March 14. During the past forty years, Mr. Gerberding has developed his company to its present prominence through hard work, patience, and decisiveness.

A. K. Forthmann, president of the Los Angeles Soap Co., was re-elected president of the Association of American Soap & Glycerine Producers, Inc., for a

A. K. Forthmann

second term at their Annual Convention at the Waldorf-Astoria Hotel in New York.

Richard C. Rumple has been appointed sales representative for the Eastern states by Valve Corporation of America. He was formerly the metropolitan New York area representative for John C. Stalfort & Sons, Inc., a pressure packaging firm.

Audrey Langdon has joined the advertising department of Air Reduction, New York. She was formerly associated with the research and development department of the Colgate-Palmolive Co. and with Kenyon & Eckhardt Advertising.

Fred J. Hope, a research chemist of H. Kohnstamm & Co., Inc. has been elected a National Counselor of the

Fred J. Hope

American Chemical Society, representing the New York section. Mr. Hope is a past chairman of the Metropolitan Long Island subsection of ACS and is a member of the Board of Directors of the New York section.

Janice K. Flagg has been appointed public relations director of Aloe Creme Laboratories, Inc., according to a recent

Janice K. Flagg

announcement by Rodney M. Stockton, president. Miss Flagg has served the Daytona Beach esort Area as assistant public relations director for the past two years and has also written articles on skin care, beauty and cosmetics. In addition to her PR functions, Miss Flagg will serve as a beauty consultant to Aloe Creme on their growing line of cosmetics.

Robert W. Walance has been appointed product manager in the United States merchandising division of Max Factor & Co. He has been with Max Factor for the past five years and was formerly the firm's director of market research.

Don F. Mills has been added to the sales staff of Givaudan-Delawanna, Inc. and its associate companies, Givaudan

Don F. Mills

Flavors, Inc. and Sindar Corp. Mr. Mills will represent the companies in the New York-Connecticut area. He joined Givaudan in January 1958 and has undergone an intensive training program in preparation for his present assignment.

Robert Varian has been appointed coordinator of new products, for Lehn and Fink Products Corp. His appointment to

Robert Varian

the newly established department was announced recently by Dr. T. S. Harrison, manager of new products. Mr. Varian was with Revlon for three years.

Robert Krone, manager of Fritzsche Brothers, Inc. Flavor Sales Division, attained Quarter-of-a-Century Club status when he completed 25 years of service with the firm on Feb. 13. A luncheon celebration was held in his honor at Charles's Restaurant, at which time he received a scroll indicative of his membership in the club. He was presented with a Government bond by the officers and directors of the firm, and a portable television set by his fellow employees.

Lee H. Bristol Jr., director of public relations of the Bristol-Myers Products division of the Bristol-Myers Co. made an address February 16 at the Business Administration Forum of the University of Florida on "A Business Man Looks at Religion" and a second address February 19 at the Creative Thinking Convocation at Webber College, Florida on "Who Knows? A Horse May Fly." Both were stimulating addresses spiced with sound sense and good humor.

Seth R. Schneible has been appointed manager of Aerosol Product Sales of Crown Cork & Seal Co., Inc. Mr. Schneible will be responsible for the development and promotion of all aerosol containers and related fitments. A graduate of the U.S. Merchant Marine Academy, he served two years as 3rd Mate with the U.S. Lines.

John J. Paredes has joined the sales force of Geigy Industrial Chemicals. Prior to joining Geigy, Mr. Paredes was associated with the Monsanto Chemical Co.

Thomas J. March has been appointed manager of sales for the Silicone Products Department of the General Electric Co. He succeeds John T. Castles who has become general manager of the Chemical Development Operation of the company's Chemical & Metallurgical Division.

Harvey C. Tull

Mark T. Concannon

Harvey C. Tull, formerly Consolidated District sales manager at the Philadelphia office of Crown Cork & Seal Co., has been named regional sales manager of the new Central Region. **Mark T. Concannon,** former manager of closure sales for the Middle Atlantic Region, becomes Consolidated District manager in Philadelphia, filling the position vacated by Tull.

Jim Stilwell, after thirty-three years of service with Houbigant, has decided to take advantage of the firm's pension plan and devote more time to fishing, hunting and care of his tropical garden. He was district manager of the mid-west territory for many years, and more recently of the south.

Mrs. Ray Hamilton has been appointed a special representative in the mid-west by Christian Dior Perfumes. She will train salesgirls. Mrs. Hamilton is the widow of Ray Hamilton, former Christian Dior representative in the same territory.

Michael J. Boyle has been appointed sales manager of the Buffalo Drug Division of McKesson & Robbins, Inc., according to an announcement by W. M. Meuller, district vice president of the Eastern District. Mr. Boyle joined the organization in 1936. In 1946 he was promoted to Wholesale Drug Salesman and in 1952 was transferred to the Providence Division as Sales Manager.

George M. Fornero has been appointed regional sales representative for the Continental Filling Corp., Danville, Illinois.

George M. Fornero

He formerly served as sales service manager for Bohn Aluminum & Brass Corporation's Betz Division.

John W. McKenzie, Jr. has joined the executive staff of Yardley of London as assistant director of marketing. He has long been associated with the cosmetic industry. Most recently he was regional manager of Hazel Bishop. Before that he was affiliated with the Tek-Hughes division of Johnson & Johnson and with Elizabeth Arden.

Edward J. Breck, president of John H. Breck Inc., Springfield, Mass. was a featured guest on the "For Women Only" show telecast over WHDH-TV in Boston recently.

Edward H. Herrick has been appointed manager of the Heyden Newport Chemical Corporation's Garfield, N. J. plant, according to a recent announcement by R. M. Aude, vice president and general manager of the Heyden Chemical Division. Mr. Herrick began his association with the corporation in 1940, and has been engaged since then in various supervisory capacities for both pilot plant and full-scale production operations at the Garfield plant.

Richard Redwood Deupree, chairman of the board of The Procter & Gamble Co., has been named national chairman for the United Community Campaigns of America for 1959. As national chairman, Mr. Deupree will lead a National Citizens Commitee and other voluntary groups in a nation-wide effort in support of 2,100 local United Funds and Community Chests campaigns.

Charles A. Gwin has been appointed a Richard Hudnut sales representative. He will represent Richard Hudnut, DuBarry, Sportsman and Ciro, the cosmetic and toiletry lines of Warner-Lambert, in Iowa.

Leo Bogart, McCann-Erickson research executive, has joined Revlon, Inc.

Daniel W. Kallman has been appointed new products manager of the Aceto Chemical Co., Inc. of Flushing, New York. Mr. Kallman, a chemical engineer, has a broad background in the chemical industry, including many years in market research and development.

John Jason has been appointed as a vice president of Jean Nate, Inc. Mr. Jason has been associated with Jean Nate,

John Jason

Inc. for over six years as general manager and assistant to Mr. Hunnefield, president.

D. H. Williams, assistant to the president, Sterling Drug, Inc. has been elected a vice president of the T. G. A., to succeed Robert E. Schwartz of the Wildroot Co., who has resigned. At the same time, Charles F. Junod was elected a director to fill Mr. Williams spot and Paul Bremer was elected to replace Owen Stoner, who is rejoining Vick Chemical Co.

Gerald J. Foster, chief engineer of Par Industries, custom aerosol fillers, Los Angeles, has been appointed plant manager. He will supervise all production and production control, filling specifications and quality control.

Book Reviews

SYSTEMATIC ORGANIC CHEMISTRY. Hugh C. Muldoon and Martin I. Blake. Size, 6x9 in., 828 pages, 54 illustrations. McGraw Hill Book Co. 1957. Price $7.75.

Where emphasis is placed on biological applications this book gives a sound basic knowledge of the subject. Each class of compound is presented in a systematic way, the simplest monofunction first followed by polyfunctional complex types. General information about the organic compounds is given first and the aliphatics, aromatics and heterocycles are also discussed.

Carbohydrates, proteins, terpenes, alkaloids, dyes and metallic organics are treated in detail. Separate sections are devoted to enzymes, antibiotics, natural pigments, vitamins, glycosides, and hormones. Industrial methods for manufacturing commercially important synthetics are outlined.

The book was written by the late Hugh Muldoon and Martin Blake both of North Dakota State College.

DISPERSION OF MATERIALS. Rolt Hammond. Philosophical Library, New York, N. Y. 1958. 230 pages, size 5½ by 8½ inches, illustrated and indexed. Price $10.00.

This is Volume II of a series on physical processing in the chemical industry. It consists of six chapters, crushing and grinding, classifying materials, fluidization, flotation, liquid dispersion and dispersion of gasses in atmospheric pollution.

A number of operations have cosmetic significance although the chapter on liquid dispersion (30 pages) is closest to toilet goods manufacturing practice. Unfortunately, after a few observations on one standard make of homogenizers, no more is said. Ultrasonic vibration is mentioned (not in the index) but little is said about ultrasonics in making dispersions.

In the chapter on crushing and grinding copper ore, coal and ironstone are about all mentioned. Talc, china clay and related materials are not included. The Hammer mill pulverizer, or so-called air pulverizers do not seem to be mentioned.

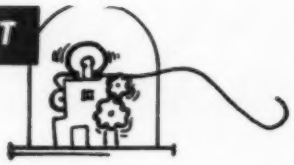
While some U. S. equipment is discussed, British practice appears to eclipse the text.

No errors were noticed. The book appears to be well made but a bit high priced.—M. G. deN.

Trade Literature

The new Honeywell Index of Literature is now available. This 24-page bulletin lists Industrial and Valve Division literature. *Product Catalogs* contain operating principles, instrument characteristics, application data, general specifications and ordering information. *Specifications* provide detailed specifications on an instrument or series of instruments. *Technical Bulletins* deal with fundamental studies of instrumentation. *Industry Bulletins* cover instrumentation as applied to an entire industry. *Systems Bulletins* describe instrumentation concerning a particular system. *Instrumentation Data Sheets* report actual application of instruments on particular processes in specific industries.

MARKET REPORT



Trade Volume Increasing

Trade in essential oils and aromatic chemicals is steadily increasing with articles that go into a general line of spring and summer items sharing in the improvement. Despite the shorter month of February, early spring purchases as well as late buying for Easter holiday goods served to swell the overall volume. Low consumer stocks brought about by cautious buying policies in the early weeks of the year served to make for a feeling of optimism regarding outlook.

TRENDS IN DETAIL

Advances	Current	Previous
Brucine, oz.		
Alkaloid	$2.00	$1.85
Sulfate	1.65	1.50
Coconut oil, crude	0.19¼	0.18⅛
Copra, coast, ton	255.00	243.00
Oil citronella, Formosan	0.55	0.52
Oil clove leaf	1.05	0.95
Oil geranium, Bourbon	19.00	18.50
Oil lemongrass	1.00	0.85
Citral	3.25	3.00
Declines		
Balsam, Tolu	2.35	2.65
Oil myrrh	24.00	26.00
Tallow, extra	0.07	0.07⅛
Grease, white	0.07⅜	0.07½
Oil grapefruit	2.10	2.25
Oil ocotea cymbarum	0.37	0.45
Oil orange, Floridian	0.95	1.10
Benzl acetate	0.55	0.58

All above prices per pound unless otherwise specified.

OIL LEMONGRASS FIRM—

A firmer trend in lemongrass, and the ability of the market to maintain slight advances, had a marked influence on the general tone of the essential oil market particularly since the oil had for many months been steadily losing ground. Some trade observers believe however that the firmness may prove temporary pointing out that another crop will be coming into the market within another thirty to sixty days.

BRUCINE HIGHER—

The price trend continues upward in the absence of any relief in the generally tight supply position of the market. The alkaloid rose 15 cents to a new high of $2 an ounce and the sulfate jumped by the same amount to the basis of $1.65 an ounce. There is considerable pressure on the demand for brucine for the account of alcohol producers particularly in view of the increased consumption of the specific formulae in which brucine is used as a denaturant.

BETTER TONE IN CITRAL—

Spot prices for citral rose 25 cents per pound, and the ionones developed a greater degree of firmness as the result of the hardening trend in lemongrass. Demand for citral and the ionones turned more active due in some measure to the improved tone as well as seasonal influences.

GLYCERIN STOCKS UP—

Glycerin stocks rose to 1,490,000 pounds in December to 56,917,000 pounds, and production was up by over two million pounds over the previous month reaching 21,361,000 pounds. In view of a broadening in consumption, some trade observers are inclined to be concerned over the statistical position in glycerin with the stock remaining below a 60 million pound level. However with the large capacity for making glycerin synthetically, output could quickly be stepped up. This is in sharp contrast to conditions several years ago when glycerin output was entirely dependent upon the rate of production schedules in the soap industry. A development in the world market was an advance in prices in Britain. This was accounted for by prices paid by British refiners for foreign crude material at above those at which American refiners were able to pay.

ALCOHOL SUPPLY AMPLE—

While the demand for some grades of alcohol continues at a high level, especially the formula going into hair lacquers, stocks are more than ample to meet overall requirements. Output of ethyl alcohol declined to 39 million proof gallons in November from 40.4 million proof gallons in October, but stocks rose to 30.6 million proof gallons in November from 26.5 million gallons in the previous month.

TARTRATE IMPORTS GAIN—

Increasing quantities of cream of tartar and tartaric acid are arriving here from Spain and Italy to supplement domestic supplies. Domestic production was discontinued late last year following an application by the major producer for an increase in import duties on both items. Following a hearing higher duties were recommended.

COCONUT OIL, COPRA HIGHER—

Crude coconut oil edged upward under the influence of an active demand for the account of European buyers. At one time oil prices reached the high levels established last November. European demands likewise served to stiffen prices for copra with the articles reaching the highest level since March, 1953.

SANDALWOOD STEADY—

Prices on oil sandalwood were fully maintained at recently advanced levels. Spot supplies remain light with recent arrivals moving into consumer channels. The exceedingly small quantities of sandalwood chips offered at the last few auctions in the primary center have tended to keep the oil market in a relatively strong statistical position.

OUTLOOK FIRM IN MINT OILS—

A firm outlook prevails in both spearmint and peppermint. Any decided upturn in spearmint sales could have an immediate stiffening influence on prices. There is the usual differential in peppermint oil prices between Far Western and Midwestern oil, the former being offered at as low as $3.85 per pound. At times the differential tends to give the impression of lower prices in the market. Midwestern oil is maintained at $4 to $4.25 a pound.

BOIS DE ROSE QUIET—

Prices on bois de rose continue at about the lowest levels in more than a year. There continues a tendency on the part of buyers to proceed with a degree of caution in the event that renewed competitive conditions might result in still lower prices.

CLASSIFIED ADVERTISEMENTS

Rates per line, per insertion: Situations Wanted and Help Wanted, 50c. All other classifications, $1.00. Please send check with copy.

FOR SALE

FOR SALE: One year's supply of latest information on market prices, new formulations, sales promotion techniques. Delivered to you on regular monthly schedule. Total investment for 12 months: $5.00. Potential return: Unlimited. Address: Circulation Dept., American Perfumer & Aromatics, 48 W. 38th St., New York 18, N. Y.

HELP WANTED

SALES REPRESENTATIVE

We require additional representation in the greater Metropolitan New York area for sales of our perfume bases, isolates and aromatics to the toilet goods and chemical specialty industries.

The man we seek has a background in Chemistry, a discriminating and preferably educated sense of smell, sufficient industrial experience to talk shop with and intelligently serve the professional people he will be in contact with.

If you are interested in a career with a well-established and progressive company, we invite you to submit detailed resume including salary requirements to:

Polak's Frutal Works, Inc. Dept. S.R. Middletown, New York

MISCELLANEOUS

LABORATORIES "ROLDÁN"
BOX 1094—CIUDAD TRUJILLO
DOMINICAN REPUBLIC
MANUFACTURERS OF COSMETICS, PHARMACEUTICALS AND PRIVATE LABELS.

"JASMIN ABSOLUTE EXACTO EXTRA D.S." Occupies a place of honor among the best that America has to offer.

Sample and price on request.

DI SALVO FINE PERFUMES
1422 Chestnut St., Phila. 2, Pa.

SITUATION WANTED

CHEMIST—Strong background in cosmetic development, production and quality control; degree in Chemistry with additional training in Chemical and Industrial Engineering; seeking position with organization that appreciates ability, integrity and initiative. Box 3185, AMERICAN PERFUMER & AROMATICS, 48 W. 38th Street, New York 18, N.Y.

Use

American Perfumer

Classified for

Best Results

PROFESSIONAL SERVICE

"L'ART de la PARFUMERIE par EXCELLENCE"
And its Application to the Industry

DR. JEAN JACQUES MARTINAT

PERFUMER-CHEMIST CONSULTANT

Perfumes
Cosmetics
Toilet Articles
Soaps
Flavors

Creations of Highly Original Perfumes
Duplications of Most Difficult Fragrances
Unique Kind of Professional Services.

Kindly Inquire

333 WEST 52ND STREET, NEW YORK 19, N. Y.
TEL. PLAZA 7-3861

RESEARCH AND DEVELOPMENT

Cosmetic Formulation and Improvement

Toxicology, skin-irritation studies, analyses and formulations, soap and syndet evaluations. Free booklet: "How to Develop Successful New Cosmetics."

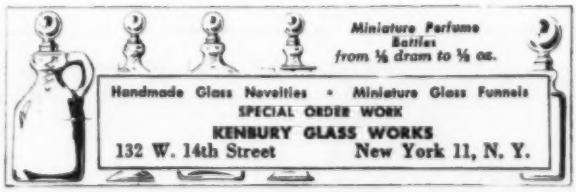
SNELL

FOSTER D. SNELL, INC.
29 West 15th St., New York 11, N. Y.
WAtkins 4-8800

LEBERCO LABORATORIES

Irritation Studies—Sensitivity Tests
Toxicity and Safety Tests on
Shampoos—Cold Wave Lotions—All Cosmetics
Pharmaceutical and Cosmetic Research
Hormone Assays—Bacteriological Studies

127 HAWTHORNE ST., ROSELLE PARK, N. J.



Carl N. Andersen, PhD
Consulting Chemist
Cosmetics, Soaps and Synthetic Detergents
OFFICE AND LABORATORY
150 South Highland Avenue, Ossining, N.Y.
Phones: Wilson 1-1550; Wilson 1-7959

Index OF ADVERTISERS

Hydronal

PURE (+) HYDROXYCITRONELLAL

HYDRONAL is not a blended speciality base, but hydroxycitronellal pure and simple:

PURE because all physical imperfections have been removed by the most modern scientific means.

SIMPLE because HYDRONAL strikes only one note: the intrinsic odour of hydroxycitronellal—true, clear, and wholly delightful.

On first appraisal, the odour of HYDRONAL may seem a little subdued. This is solely due to the absence of discordant fatty or citronellal-like by-odours which have hitherto distorted the odours of commercial and even speciality grades. Once matured in a perfume compound HYDRONAL lacks nothing in strength and stability, and special packing under nitrogen ensures that it reaches the consumer in the same immaculate condition in which it leaves the plant.

To appreciate the true character of hydroxycitronellal and all its possibilities as a perfume component, a trial with HYDRONAL is essential.

ONE OF THE ABRAC PURE PERFUMERY CHEMICALS

ABRAC A. BOAKE, ROBERTS & CO LTD LONDON · ENGLAND

AGENTS FOR U.S.A. TOMBAREL PRODUCTS CORPORATION · 725 BROADWAY · NEW YORK 23

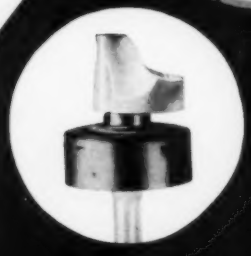
for repeat sales

COMPLEMENT BOTTLE BEAUTY

with this RISDON aerosol valve's

BEAUTIFUL SPRAY PERFORMANCE

- Wider cone, finer, drier spray cloud and longer lasting contents promote customer satisfaction and brand loyalty.
- Applicable to both 2-phase and 3-phase spray products in either coated or uncoated glass, plastic or metal containers. Special actuator design gives top quality performance on virtually any pressurized product including ultra-low pressure products, water-base products and products not soluble in propellant.
- Permits greater formulation latitude – minimizes propellant – facilitates elimination of dilution effects on fragrance or other qualities of product.
- No metal in contact with contents – No spring – Instant "on-off" action. Vertical or Horizontal spray. Also available with foam actuator.
- Available with custom-designed metal or plastic caps.



contact Risdon for further details and free operating samples . . .

RISDON

THE RISDON MANUFACTURING CO.